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Dental Digest

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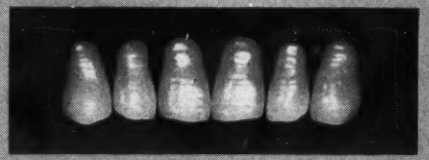

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708 Church Street, Evanston, Illinois

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About Our CONTRIBUTORS

JOSEF NOVITSKY, D.D.S. (University of California, College of Dentistry) in 1940 completed a half century of his dental career which he started as an office boy for a San Francisco dentist. His professional training included four years' surgical experience at Lane Hospital, San Francisco, and three years in the Division of Surgical Pathology of Leland Stanford's Medical Department. This thorough grounding in medical and dental knowledge has enabled Doctor Novitsky to contribute authoritative articles regularly to the dental literature for many years, especially on the pathologic aspects of dentistry. The concept of asphyxia due to pressure on the carotid sinus, expressed in LUDWIG'S INDURATIONS in the January 1942 issue of DENTAL DIGEST, is elaborated in the current presentation, THE CAUSE AND TREATMENT OF DEEP SUBLINGUAL INDURATIONS (LUDWIG'S ANGINA).

CHARLES L. MEISTROFF, D.D.S. (Medical College of Virginia, School of Dentistry, 1931) presents the second in his series of three articles on the use of the Impactor in exodontia. How this instrument facilitates extractions is illustrated by roentgenograms in THE IMPACTOR IN SOCKET EXPANSION TECHNIQUE.

ABRAHAM H. TAMARIN, D.D.S. (Chicago College of Dental Surgery, 1917) is a general practitioner. THE ART OF CASTING AN AXIAL PORCELAIN OR ACRYLIC VENEER CROWN is one of several articles by Doctor Tamarin on bridge construction which have appeared in the literature. His artistic interests have extended to the extra-professional teaching of art for several years in a girls' school in suburban Chicago.

EDWIN AUBER PEEBLES, D.D.S. (Ohio Dental College, 1892) specializes in oral surgery. He is a member of the International Association of Anesthetists and has taught, addressed professional groups, and written about anesthesia. His comments on ANESTHESIA FOR THE ORAL SURGEON are supplemented by an original idea for facilitating the administration of sodium pentothal.

JACK F. CATHCART, D.D.S. (University of California, College of Dentistry, 1926) specializes in prosthetics. He describes the use of plaster impression trays in his article, SIMPLIFIED TRAYS FOR FULL DENTURE MUCOSTATIC IMPRESSIONS. Doctor Cathcart has served in the Navy and entered the ranks of DIGEST contributors in March of this year.

LOUIS G. HILL, D.D.S. (Ohio State University, College of Dentistry, 1923) specializes in exodontia. He has been Director of Dentistry at the Maumee Valley Hospital for twenty years and an oral surgeon on the Flower Hospital staff the same period of time. His technique for the DIRECT INJECTION OF PENICILLIN INTO THE ORAL TISSUES is directed particularly to dentists who have had hospital training.

The Cause and Treatment of DEEP SUBLINGUAL INDURATIONS (*Ludwig's Angina*)

JOSEF NOVITZKY, D.D.S., Berkeley, California

DIGEST

Death from Ludwig's angina is attributed to one of two causes: (1) the failure of venous return to the right side of the heart because of pressure on the carotid sinus; (2) mechanical choking due to swelling. In either case, asphyxia (chemical or mechanical) from pressure causes death.

Pressure is produced by sublingual indurations which have been allowed to develop through the dental neglect of "cold" suppurations from anaerobic streptococcal infection in a pulpless tooth or a root in the lower jaw. In mechanical asphyxia the floor of the mouth and the tongue are pushed up, blocking the epiglottis and preventing respiration. In chemical asphyxia pressure on the nerve center (carotid sinus) increases respirations which gradually deplete the available carbon dioxide in the tissues and the blood. In the bed-ridden patient muscular metabolism is retarded and fails to renew the respiratory stimulant, carbon dioxide. Muscle tone collapses and asphyxia results from respiratory and circulatory failure secondary to continued pressure on the carotid sinus.

Knowledge of the chemistry of respiration and the influence of the carotid sinus on venous pressure and respiration are essential for a complete understanding of death from Ludwig's angina.

SWELLING AND induration of the tissue sheaths of the floor of the mouth and the anterior part of the throat commonly are due to the products of suppuration from anaerobic streptococcal infection in a pulpless tooth or root in the lower jaw.

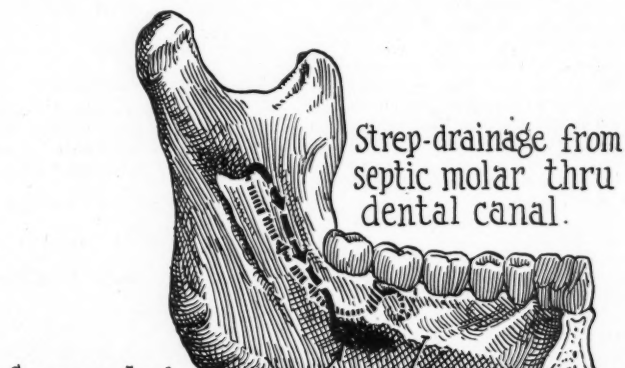
Etiology

Early observers, before and after Ludwig's day, with few exceptions were unaware of the etiology of suppurative extensions. In recent years the high death rate from these indurations has declined and the correct etiology has been established.

1. Moty in France in 1892 and Cryer[1] in America in 1901 appear to have been the first to attract attention to lingual drainage from lower molars. Moty has been quoted by Ashhurst,[2] and by others who quote Ashhurst, as pointing to lingual exudate from suppurating teeth as a cause of Ludwig's angina.

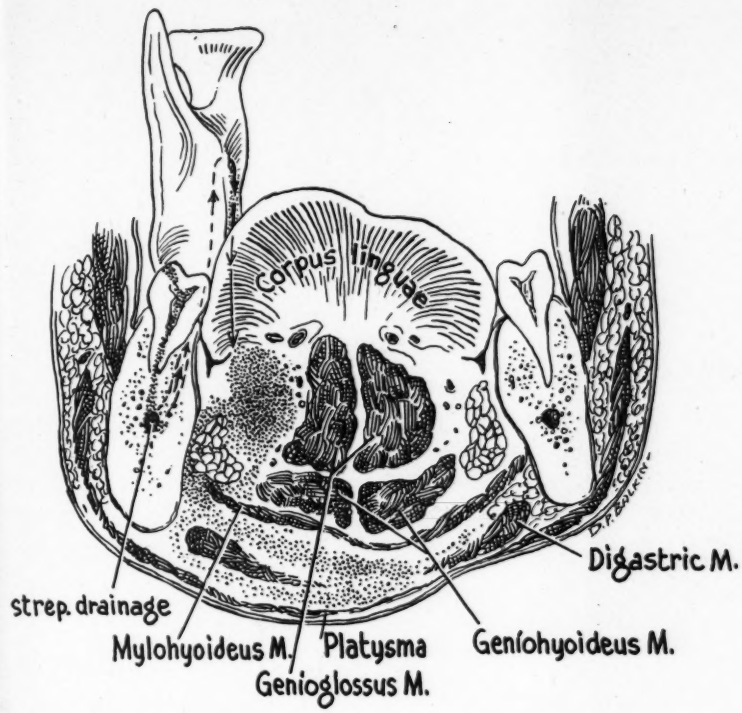
2. Cryer pointed to defects of the lingual plate over the lower third molar root ends in dry specimens

[1]Cryer, M. H.: Studies of the Internal Anatomy of the Face, Philadelphia, S. S. White Dental Manufacturing Company, 1901, pages 6-30.
[2]Ashhurst, A. P. C.: Ludwig's Angina, Arch. Surg. 18:2047-2078 (May) 1929.



1A ***Lingual side of mandible. A similar illustration was published by the author in the*** **Pacific Dental Gazette**[3] ***in 1915. The following legend, now of historic import, accompanied it: ". . . shows the way for drainage from the dental foramen downward and forward along the mylohyoid groove with direct access . . . to the submaxillary triangle." Now others, after thirty years, are calling attention to this anatomic gateway as a reason for pathologic involvement of the floor of the mouth and the throat.***

This gateway down the mylohyoid groove between the posterior insertion of the mylohyoid muscle and the anterior edge of the internal pterygoid muscle allows collection of septic drainage under the mylohyoid muscle, the roof of the floor of the mouth. If this drainage is streptococcal, it marks the beginning of the pathologic entity called Ludwig's angina.



1B *Section of mandible anterior to the second molar region. Third and second molars are the main offenders, but any streptococcal lower tooth draining under the mylohyoid muscle may produce the induration discussed.*

and stated: "These defects offered direct access to the submaxillary triangle from abscessed wisdom teeth."

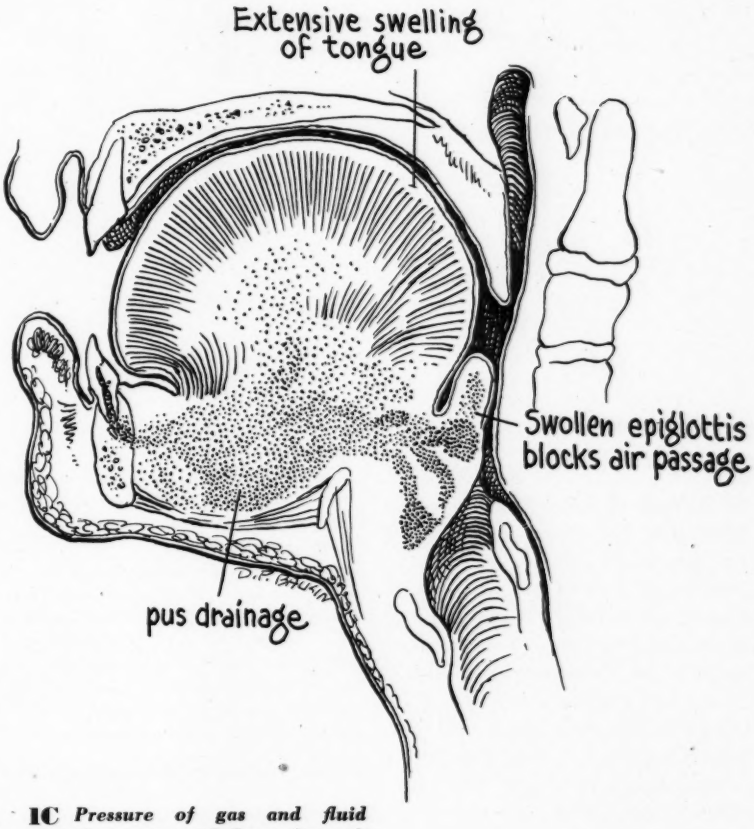
3. Novitzky,[3] beginning in 1912, encountered clinically dental suppuration of the inferior dental canal, draining down the mylohyoid groove from the inferior dental foramen of the mandible (Figs. 1A, 1B, and 1C). He had difficulty in securing agreement with his diagnosis; inferior dental canal suppuration was a new pathologic entity in San Francisco in 1912 and 1915.

Cause of Terminal Induration

Early stages of "cold" suppuration seen by the dentist formerly were allowed to progress into terminal induration mainly because the dentist was unaware of the streptococcal nature of the suppuration; the general surgeon, on the other hand, when confronted with the terminal stages, had graver conditions to consider. The lack of intelligent teamwork between dentists and physicians resulted in a continuance of etiologic obscurity. To this extent the cause of terminal induration could be said to have been due to dental neglect.

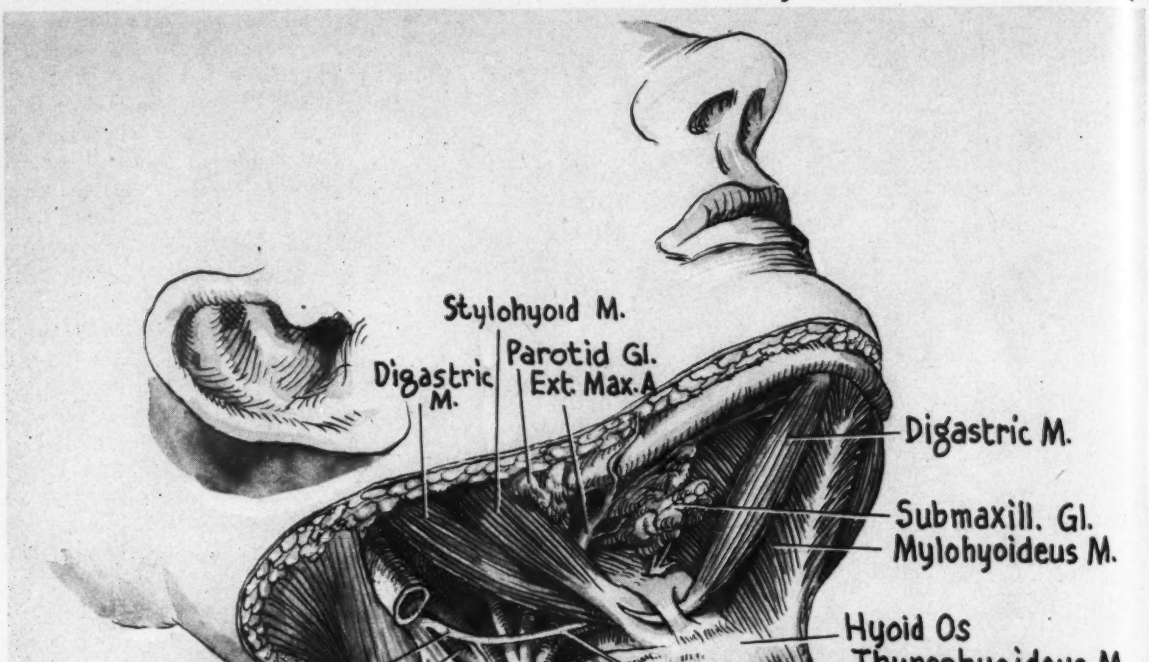
Anaerobic Infection—Now it is obvious that both the normal osteology of the mandible and deviations from the normal are concerned in the spread of the infection. The specific types of infection that cause (1) a localized point-forming abscess and (2) a spreading induration, should be recognized. The first is due to an aerobic pus-forming infection; the second is due mainly to an anaerobic or partial anaerobic gas-producing infection.

The anaerobes force tissue sheaths apart with pressure from gas and fluid. Death is caused by pressure



1C *Pressure of gas and fluid pushes the tongue and floor of mouth up, causing mechanical asphyxia. Downward pressure, along the carotid sheath, results in chemical asphyxia.*

[3]Novitzky, Josef: The Radiograph in Dentistry, Pacific D. Gaz. 23:265-277 (May) 1915; Notes on Radiographs and the Surgical Treatment of Septic Teeth and Alveolar Process, Panama-Pacific D. Congress 2:548-560, 1915.



2 ***Anatomy of structures of neck with exposure of carotid sinus. Pressure continued on this nerve center is fatal. According to S. W. Ranson (Anatomy of the Nervous System, ed. 8, Philadelphia, W. B. Saunders Company, 1947, page 341), "Receptors of great importance for the regulation of respiration and blood pressure are situated in the carotid sinus . . . The carotid sinus is an enlargement of the carotid artery at its bifurcation . . ."***

on vital nerve centers (*Fig.* 2) *or by mechanical choking due to swelling* (*Fig.* 1C). The aerobes cause yellow pus formation, mainly; the infection that results points and discharges, usually externally. Fluctuation is present in the pus-producing abscess, but it is not observed in the streptococcal suppuration unless mixed infection is superimposed on the primary infection.

Streptococci in Teeth—The presence of anaerobic streptococci is additional evidence of a dental focus as a cause of the induration. Years ago dental findings indicated that an overwhelming number of pulpless teeth were infected with anaerobic streptococci. Treated and sealed streptococcal teeth are more of a menace to life than teeth in advanced stages of aerobic infection draining into the mouth.

The mixed infection does not cause the primary induration under discussion. It is due to the retention in the extraction wound of anaerobic streptococcal infected tissue and to the facultative capacity of aerobic streptococci to become pathogenic in traumatized tissue. This is the reason why indurations follow the extraction of infected teeth.

Removal of Pulpless Teeth—The removal of pulpless teeth has been advocated repeatedly. Extraction

alone does not necessarily remove abscessed tissue at the root ends, and the retention of an abscess wall in a traumatized extraction wound may well cause death. The literature of Ludwig's angina reiterates that "the swelling followed the extraction of teeth." Physicians tend to blame local anesthetic injections used by the dentist but the trouble is mainly due to incomplete surgery.

Cause of Death

Edema of the glottis, toxemia, bacteremia, and heart failure have been considered to be causes of death from Ludwig's angina.

1. The much quoted "edema of the glottis" is a mistake in diagnosis handed down over the years; it is not factual. In the first place, if the larynx, which is the glottis proper, is involved in the swelling, there is a loss of speech. But this loss does not occur in Ludwig's angina. If loss of speech is present it is not a dental case; it belongs in the medical field. In the second place, if the larynx obstruction were the cause of death in Ludwig's angina, life could be saved by a tracheotomy. Death often follows this operation, however, despite detouring the airway to a point below the larynx.

Speech is not interfered with unless the floor of the mouth and the tongue are pushed up, blocking the epiglottis. Not only speech becomes impossible but respiration as well. In this case tracheotomy allows free breathing. The saving of life, however, depends on re-establishing an airway; it depends in addition on incisions to drain and relieve pressure on the carotid sinus region. If pressure is allowed to remain on this vital center, death follows despite a re-established airway below the larynx.

2. Toxemia and bacteremia may be present but seldom cause death. Physiologic clotting of the lymph or of the tissue fluid inhibits a toxemia while blocked blood vessels retard blood stream infection.

3. *Pressure is the real enemy; it accomplishes the end in its own way.* It would be more accurate to say that death resulted from a failure of venous return to the right side of the heart, the result of pressure on the carotid sinus (Fig. 2). The increased number of respirations and the gasping caused by pressure on this nerve center use up the available carbon dioxide in the tissues and in the blood. Lack of muscular metabolism in the bed-ridden patient fails to renew the respiratory stimulant. A vicious circle of loss of muscle tone and respiratory failure follows, the heart beating feebly and rapidly to the last, long after muscle tone has collapsed. Asphyxia comes from circulatory failure as well as from respiratory failure secondary to continued pressure on the carotid sinus.

The greater the tone of respiratory muscles, the greater the lung expansion and the greater the negative pressure in the thorax. The amount of carbon dioxide produced determines the volume of respiration and the tonus of muscles as well as venous pressure which accelerates venous return to the heart and maintains the volume of circulation.

We have, then, two types of asphyxia to combat in Ludwig's angina: (1) mechanical asphyxia, caused by the floor of the mouth and the tongue being pushed up by gas and fluid under the mylohyoid muscle; (2) chemical asphyxia and failure of venous pressure, due to trauma to and pressure on the carotid sinus. Tracheotomy will save life in the first type of choking but it will not save life in the second.

Henderson's[4] research on the chemistry of respiration and the influence of the carotid sinus on venous pressure and respiration has been made of practical use by me for a complete understanding of the fatality from Ludwig's angina. This is a dental contribution to the medical history of these indurations.

Treatment

In the early stages, procaine can be used for conduction anesthesia; in advanced indurations there are no absolutely safe anesthetics for the surgical opening of the tissue sheaths. Intravenous pentothal sodium has the advantage of being administered away from the respiratory system. Oxygen with 6 per cent carbon dioxide should be used with it, as indicated, to maintain normal respiration. If the tongue and mandible are not fixed immovably and drop back, the parts must be held forward just as in inhalation anesthesia. Gwathmey's rectal anesthesia with ether and oil should be considered. If gas and oxygen are used, carbon dioxide should be supplied as indicated.

In Early Stages—Any abscess of a lower tooth draining *lingually* should be considered as a potential Ludwig's angina.

1. Swelling that has involved the soft tissue outside the tooth should be incised for drainage. Tooth removal and bone surgery should be postponed until the inflammatory reaction is well limited and physiologic defense is re-established through adequate circulation.

2. If swelling has made extensive headway and drainage into the mouth is no longer sufficient, the gingivae opposite the offending tooth may be retracted from the mandible.

a) A curved clamp forceps is pushed down between the flap and the bone until the point of the instrument can be felt under the skin below the body of the mandible.

b) A small incision allows the instrument to emerge.

c) The opening is enlarged by opening the forceps and spreading the opening.

d) A perforated rubber tube is pulled up through the opening, allowing the tube to remain for a drainage-way. (A buccal drain has been found to be equally as efficient as a lingual drain. It is necessary, however, to locate the exact focus responsible for the infection and insert the drain where it will tap the exudate.) Roentgenograms will usually show the buried root or the tooth responsible for the swelling.

Irrigations of 1 or 2 per cent physiologic sodium chloride solution at 115° Fahrenheit used in the mouth and through the drain will produce exosmosis and deplete the swollen parts of dead cells and fluids.

In Advanced Stages—If the case

[4]Henderson, Yandell: Adventures in Respiration, Baltimore, The Williams & Wilkins Company, 1938, pages 1-270.

has been neglected and incisions are necessary which extend from beneath the chin to under the mylohyoid muscle and wide opening of the throat is essential, the general surgeon inherits an unwelcome job. The work of Grodinsky[5] has shown the common gateway for the pressure of gas and fluid between the tissue sheaths under consideration. A study of his work is vital to an understanding of the problem.

1. *Mechanical asphyxia* must be relieved by removing pressure under the floor of the mouth and by a tracheotomy, if necessary; *chemical asphyxia* must be prevented by removing all pressure on the carotid sheath.

2. After pressure has been removed, hot wet applications must be used to encourage circulation.

3. Strychnine should be used to stimulate spinal nerves and help re-establish tone in muscles.

4. Inhalations of 6 per cent carbon dioxide in air or in oxygen are vital if pressure has been on the carotid sinus. These inhalations support respiration and re-establish venous pressure.

5. If the patient is overbreathing, morphine may be necessary to retard the respiratory rate.

6. Transfusions of whole blood to furnish corpuscles or of plasma to inhibit clumping of corpuscles in the vessels should be resorted to, if necessary.

Drugs to increase the number of respirations are ordinarily not indicated. Blood stream medication to eliminate a focal infection theoretically must fail because of lack of circulation and the halo of broken-down blood around the focus. If circulation is re-established, penicillin should be of benefit.

2247 *Prince Street.*

[5]Grodinsky, Manuel: Ludwig's Angina, Anatomical and Clinical Study With Review of Literature, Surgery 5:678-696 (May) 1939.

Cancer In the Southern States

C. L. MARTIN, M.D., and CARLETON WRIGHT, M.D., Dallas

CANCER OF the exposed surfaces of the skin and cancer of the mouth are of unusual interest to physicians in the Southern states because of their high incidence in this area.

In 1939 it was observed that the increase in the number of oral lesions over that found in other regions was confined almost entirely to women. Experience indicates that it is due to the prevalent *habit of snuff dipping* among the women of the poorer classes in the South. About 90 per cent of the women admitted to our clinic with cancer of the mucosa of the cheek and palate have dipped snuff for long periods of time.

There is a high incidence of cutaneous cancer in farmers and ranchers in the Southwestern states. Of 3,683 cancers recorded in a United States Public Health survey made for the Dallas-Fort Worth area in Texas in 1939, 33.8 per cent were cutaneous lesions. The next highest figure was 30.3 per cent recorded in Birmingham, Alabama. Most dermatologists believe that this high incidence results from *constant exposure to sunshine and hot winds*, which produce multiple precancerous lesions in the blond type of skin found so predominantly in the white population of the Southwestern states.

Malignant lesions of the skin are so common in Texas that the average outdoor worker is prone to disregard them until they become large enough to cause pain or inconvenience.

From *Journal of the American Medical Association* 134:861 (July 5) 1947.

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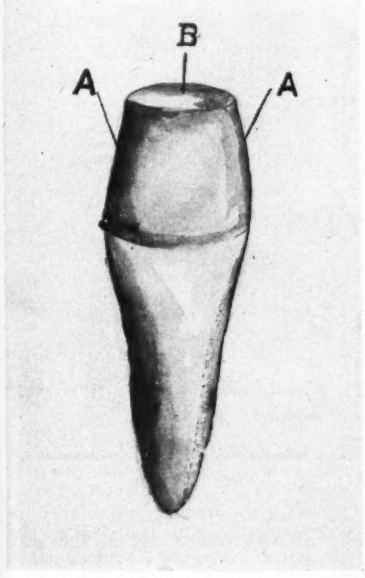
We hope that you will accept this invitation!

The Art of Casting an AXIAL PORCELAIN or ACRYLIC VENEER CROWN

A. H. TAMARIN, D.D.S., Chicago

DIGEST

A method is described for casting a metal frame for a veneer crown that will ensure an accurate gingival fit and at the same time allow sufficient space between the preparation and the casting for an insulating layer of cement.



1. ***Preparation of a lower second bicuspid for the reception of a veneer crown.***

Indications for Use

THE PORCELAIN veneer crown is indispensable as an abutment in fixed bridges. It is chiefly indicated wherever strength and esthetics are concerned: for example, (1) as a restorative measure in a badly broken-down anterior tooth or a bicuspid; (2) as a secure abutment of an upper or lower cuspid or first bicuspid in bridges, when three or more missing teeth are involved.

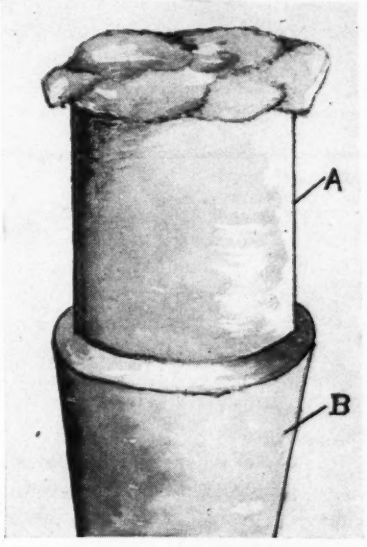
The porcelain veneer crown should fit perfectly under the free margin of the gingiva. It must also furnish enough space around the central or axial portion of the tooth for the cement which is to serve as an insulator against thermal shocks to the pulp.

Technique

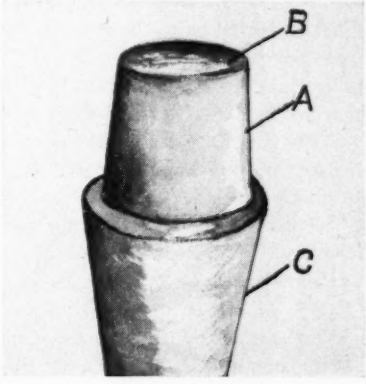
Direct Method—1. Prepare the tooth properly by removing its convexity, obtaining parallel or slightly tapered walls (A in Fig. 1). Relieve the occlusal surface (B in Fig. 1).

2. Select a proper copper band, trim it, and obtain a modeling compound or baseplate wax impression of the tooth (A in Fig. 2).

3. Make a model of hard investment compound (B in Fig. 2).



2. ***Copper band impression together with investment compound model.***



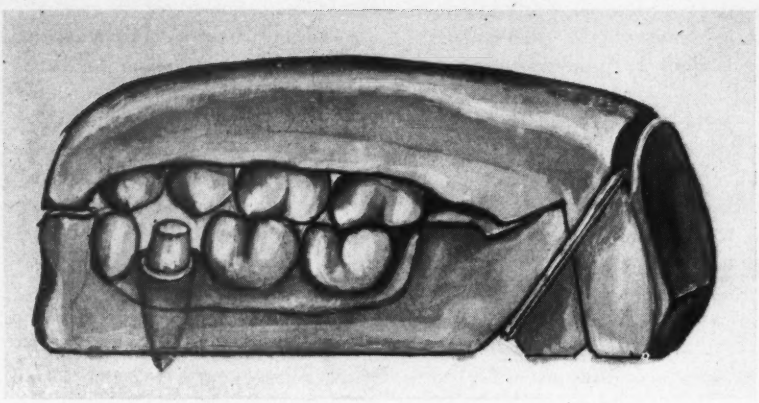
3. ***Investment compound model of the lower second bicuspid.***

4. Prepare the model properly and cover the surface with vaseline (C in Fig. 3).

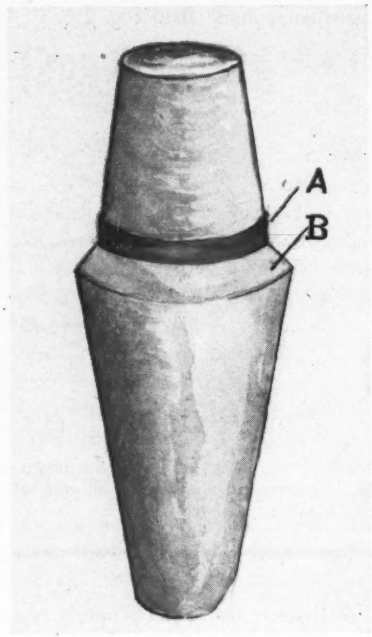
5. Obtain a plaster impression, including the tooth being restored, and a wax bite. Place the model in the plaster impression. Make a cast and articulate (Fig. 4).

6. Remove the model of the tooth from the cast in the articulator and with a flat knife elongate the tooth about 1 millimeter at the cervical margin (A in Fig. 5). This extra space will allow the crown to penetrate beneath the free margin of the gingiva. Also convert the borderline of the model from a right to an obtuse angle (B in Fig. 5).

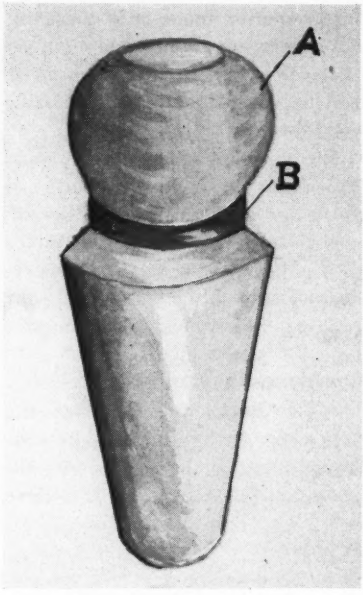
7. Cut a wax band one millimeter in width (Kerr casting wax, green



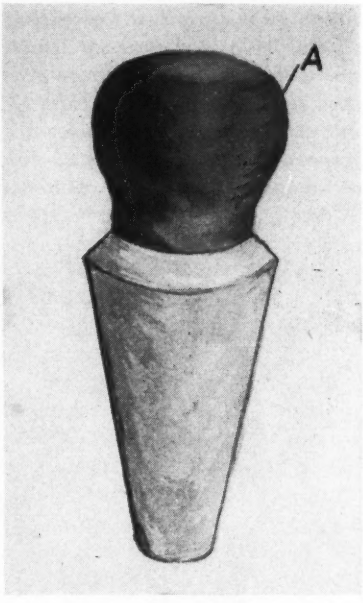
4. *Model of tooth involved placed in position on the plaster articulator.*



5. *Investment compound model with crown extended one millimeter below the free margin of the gingiva and covered with a wax band of the same width. The marginal angle has been changed from a right to an obtuse angle.*



6. *Model with the convexity of crown reproduced in investment compound.*



7. *Model with crown completely covered with wax, gauge 30.*

soft sheet, gauge 30) and adapt it around the cervical margin. This will cause the porcelain veneer crown to fit perfectly under the free margin of the gingiva (A in Fig. 5).

8. Between the wax band at the cervical margin and the occlusal surface, build up the original convexity of the tooth with a thin mix of investment compound (A in Fig. 6). The wax band at the gingivomarginal area is to be exposed and free from investment compound (B in Fig. 6).

9. After obtaining the proper shape of the tooth, let the investment compound crystallize. Replace the model on the articulator, adjust, and allow enough space interproximally for the wax pattern.

10. Remove the model from the articulator and cover the entire crown with wax (Kerr casting wax, green soft sheet, gauge 30). Adapt the wax carefully, starting at and including the gingivomarginal wax band and ending with the occlusal surface (A in Fig. 7). Adapt this wax to the walls of the crown with an eraser.

11. To obtain a smooth surface on the wax pattern, revolve the pattern over the Bunsen flame. Allow enough heat to affect or melt slightly the surface of the wax and insert it immediately into a dish of cold water.

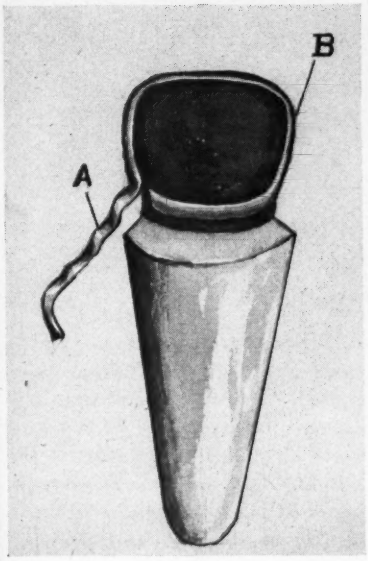
12. Place it on the articulator and see that it fits interproximally. Remove the model from the articulator.

a) With a strip of wax wide enough to form an extension around the buccal or labial surface, form a framelike border (B in Fig. 8).

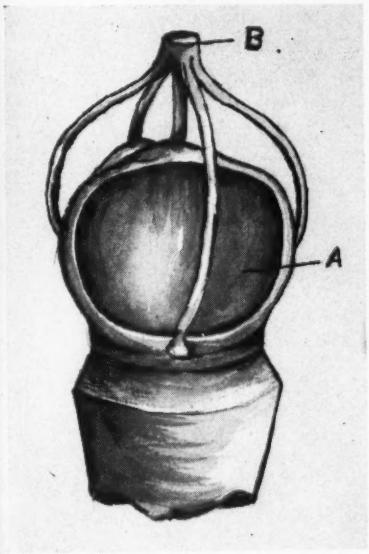
b) With a warm spatula adapt this strip of wax posteriorly to the wax wall of the crown.

The inner angle of the frame thus formed by the band extends posteriorly to a degree at which it terminates in a sharp acute angle. This angle will give maximum retention to the acrylic facing. In the case of a porcelain facing, the extreme end of the angle will be filled with cement.

c) Now place the model back upon the articulator for adjustment, and add to the occlusal surface enough wax for the desired cusps.



8. *A band of wax, gauge 30, forming a framelike extension around the buccal surface.*



9. *Wax production of veneer crown ready to be invested and cast.*

13. Remove the model with the wax pattern from the articulator. Fill in the buccal or labial frame with investment compound and allow it to crystallize (A in Fig. 9).

14. Adapt wax sprues to opposite sides of the wax pattern, terminating these sprues in one common center (B in Fig. 9).

15. Invest the pattern, together with the model, and cast the crown directly on it.

Place the crown in the patient's mouth; adjust and finish it. The cast porcelain veneer crown will fit perfectly under the free margin of the gingiva and provide adequate space around the central portion of the tooth for the cement which is to serve as an insulator against thermal shock.

Indirect Method—1. and 2. The first and second steps are the same as those in the direct method.

3. Make a plaster model instead of one of investment compound (Fig. 3).

4., 5., and 6. The fourth, fifth, and sixth steps are the same as those in the direct method (C in Fig. 3; Fig. 4; A and B in Fig. 3).

7. Cover the entire crown of the plaster model (A and B in Fig. 3) with a sheet of Kerr casting wax, gauge 30, and adapt the wax on a wet surface to permit the removal of the wax pattern from the plaster model.

8. On the wax coat or cover, apply a thin mix of investment compound, one millimeter away from the gingivomarginal line, until the original convexity of the tooth is reproduced (A in Fig. 6).

9. Cover this layer of investment compound with another layer of wax. This layer should be united with the wax band at the gingivomarginal line (B in Fig. 6).

a) Reproduce the cusps and labial or buccal frame as in the direct method (Figs. 8 and 9).

b) Remove the crown from the plaster model and with the sharp point of a broken razor blade or knife, make a circular incision upon the inner surface, or first layer of wax, just above the gingivomarginal line; remove the inner coat of wax completely. This procedure will expose the inner surface of the investment compound which helped to build up the convexity of the tooth.

10. Apply wax sprues to the outer surface of the wax pattern (B in Fig. 9), invest, and cast. The plaster model on which the crown was built is being preserved. The investment compound which takes the place of the plaster model unites with the inner surface of the investment compound that reproduced the convexity of the tooth, thereby forming one continuous mass of investment compound.

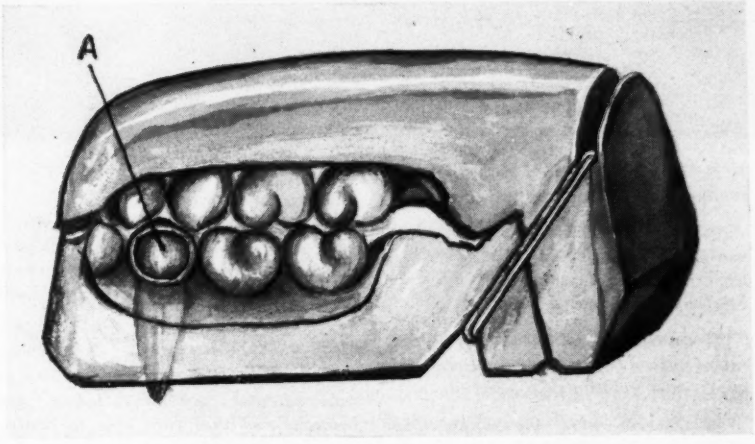
11. After the crown is cast, place it back on the plaster model, then on the articulator; adjust and polish it (A in Fig. 10).

12. By this method the crown can be adjusted and finished on the articulator.

13. Grind in a porcelain facing and cement it into position or process an acrylic facing.

When a porcelain veneer crown is used as an abutment in a fixed bridge, the facing is processed. If made of porcelain, it is cemented into position after the soldering.

3460 *Lawrence Avenue.*



10. *Gold cast veneer crown placed on plaster model and articulator.*

The IMPACTOR

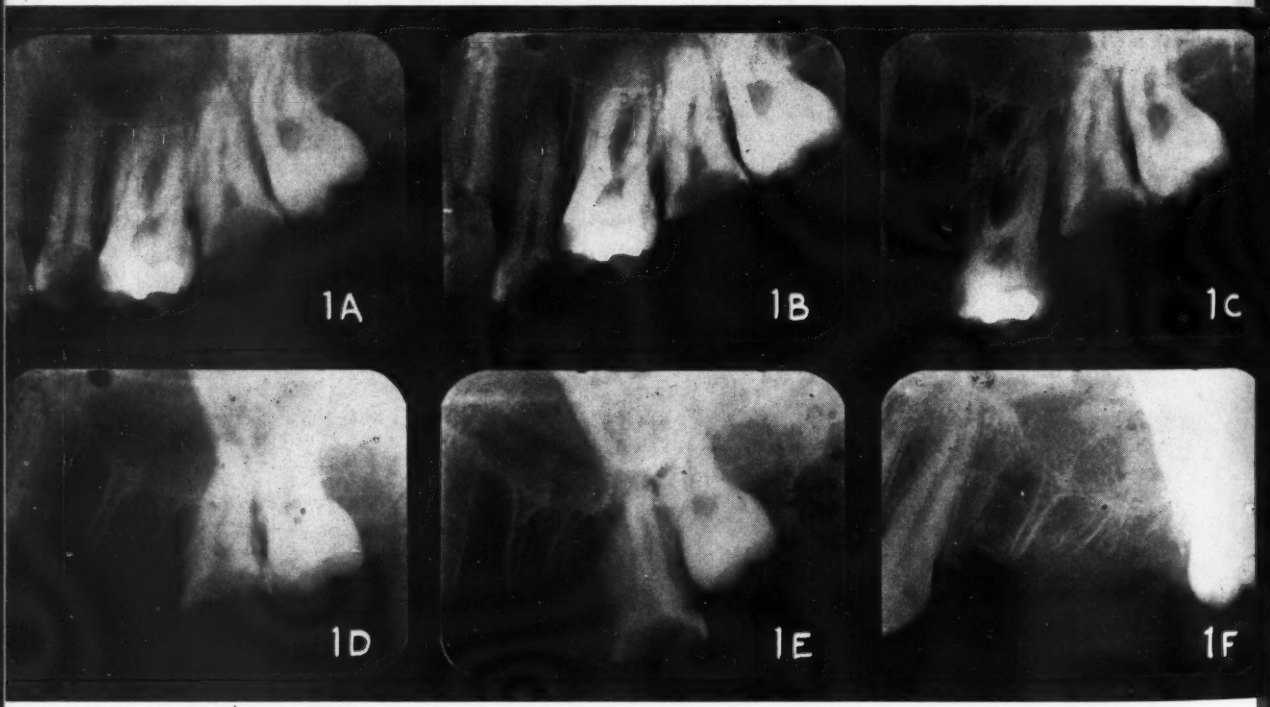
in Socket Expansion Technique

CHARLES L. MEISTROFF, D.D.S., Richmond, Virginia

DIGEST

The efficient control of pressure distinguishes the application of the socket expansion principle with the Impactor from the traditionally used method of hand elevators and gouges. Roentgenographs illustrate extraction cases in which the instrument has been used.

This is the second in a series of three articles on the use of the Impactor in exodontia. Last month Doctor Meistroff discussed psychologic aspects of tooth extraction in relation to the patient and the general advantages of the instrument in facilitating extractions and preventing postextraction sequelae.



1—Simple forceps delivery type.

A *Upper left second bicuspid, first, second and third molar present.*

B *Bicuspid partly eased out of alveolus. Alveolus expanded enabling hypercementosed root and alveolar bottleneck to clear each other.*

C *Intact alveolus, empty; first molar eased out of socket, and alveolar-root relationship severed.*

D *Observe here the empty first molar alveolus with the enlarged palatal root accommodation. Note also interradicular septi are intact, not broken, and therefore able to contribute to formation of good alveolar ridge.*

E *Second molar eased out of dentoalveolar relationship.*

F *Alveoli empty and extractions completed.*

The gouge-shaped point was directed subgingivally to the bifurcation of the molars and to the same relative depth on the bicuspid root. The left forefinger was placed over the operating area and the progress of the point ascertained and checked with each blow.

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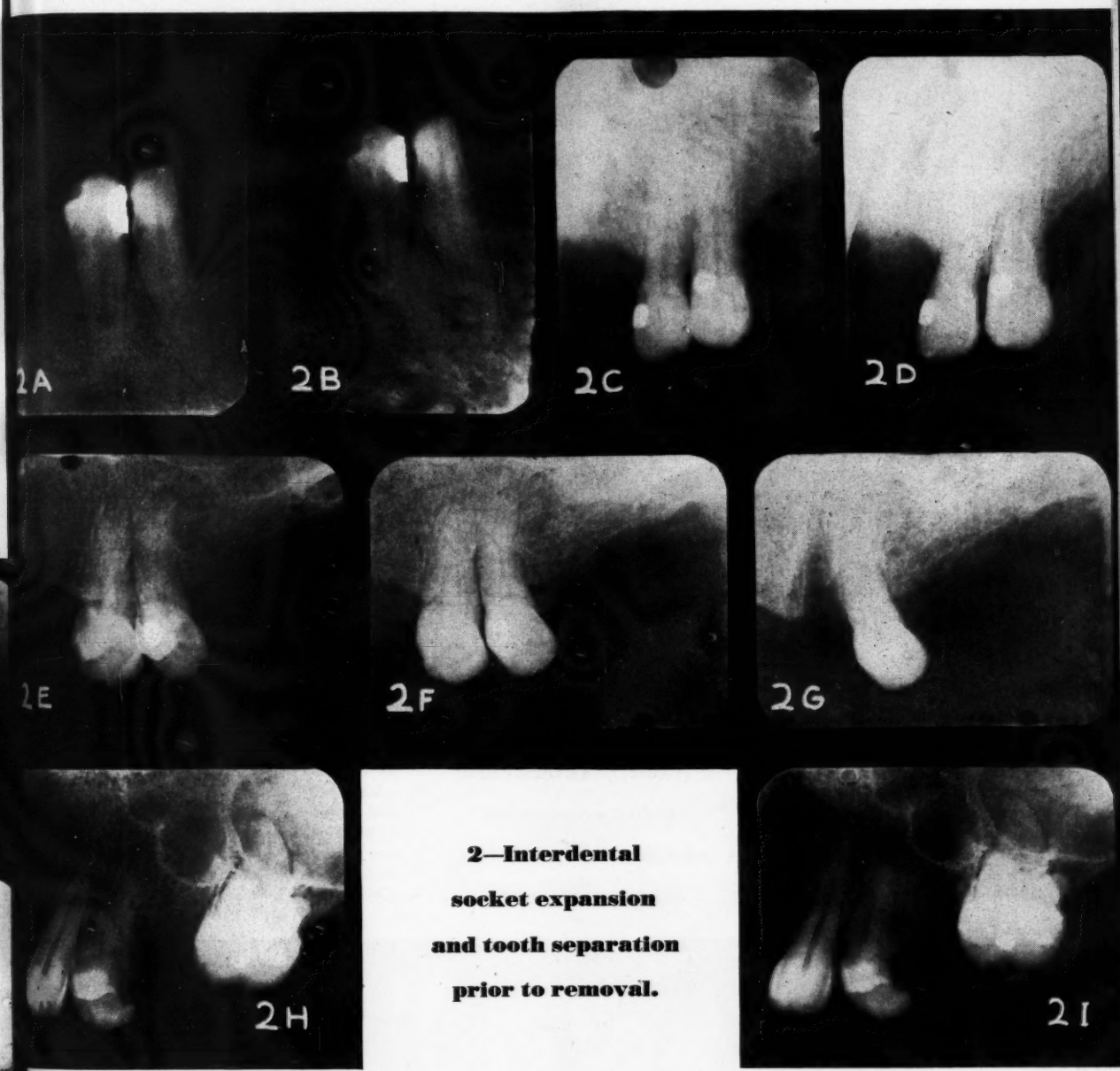


2—Interdental socket expansion and tooth separation prior to removal.

1 (Cont.)

The only other instruments used, besides small impactor gouge point, were: small hand elevator (type of Clevedent No. 34) to determine extent of expansion and forceps adaptation; Cryer's upper Universal forceps; small rongeurs for removing alveolar spiculi.

In a simple case such as this, found in the average dental practitioner's office, it may be seen that the alveolar bone is very plastic. It can be handled with ease, provided care is also used, and worked extensively if not accompanied by unnecessary trauma. After extractions are completed, the expanded bone plates can be pressed back to place.

A, *Lower right first bicuspid and cuspid in proximal contact;* **B,** *teeth separated by means of a Lecluse Impactor point; further separation augmented by rotating motion of the forceps beaks interproximally.*

C, *Upper left lateral and cuspid in contact;* **D,** *teeth separated by same technique and point as were used in Figure 2B; extraction greatly facilitated.*

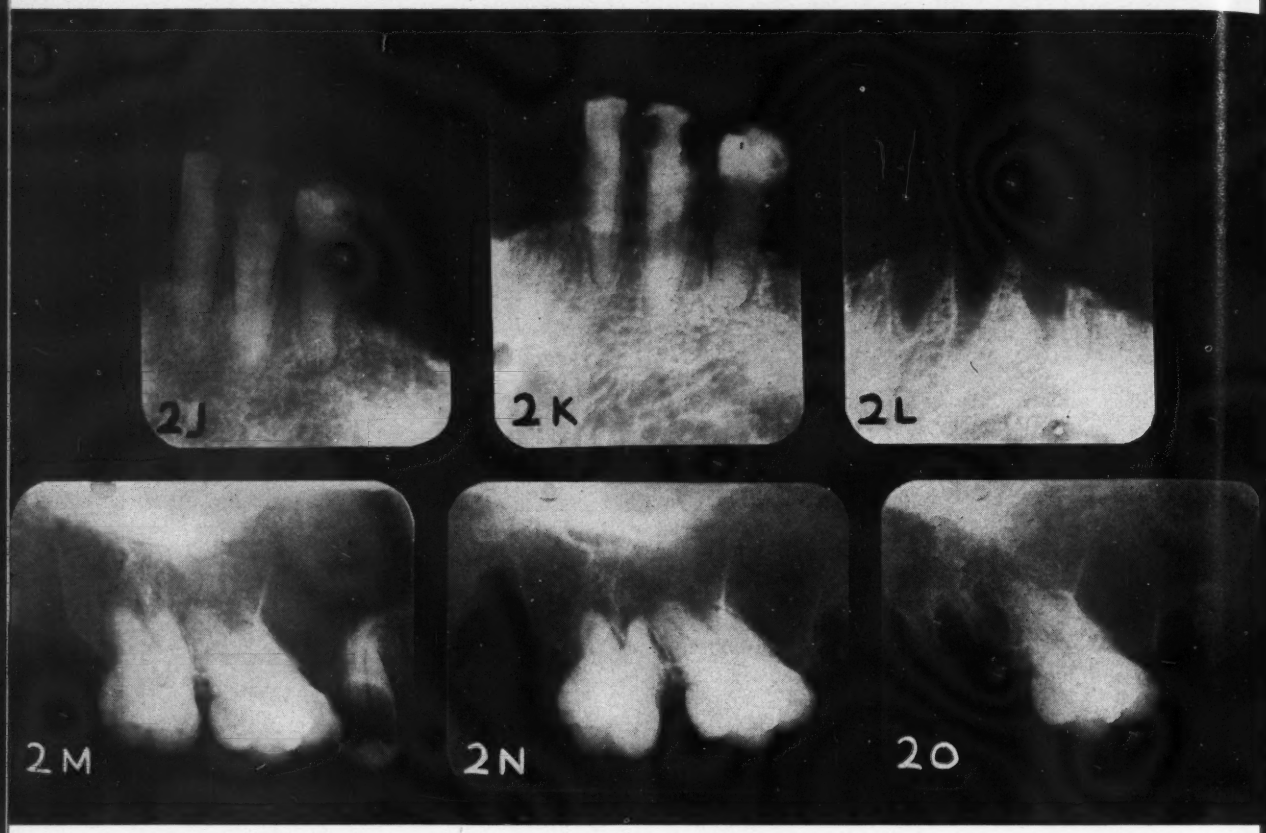
E, *Upper left bicuspids;* **F,** *teeth separated;* **G,** *second bicuspid remaining and loose.*

H, *Upper left cuspid and first bicuspid proximating;* **I,** *teeth separated.*

(*Continued on next page*)

THE EFFICIENCY of the Impactor in socket expansion is without equal in the field of exodontia. The traditional use of hand elevators and gouges, requiring full and difficultly controlled manual force, threatens complications and entails unnecessary risks.

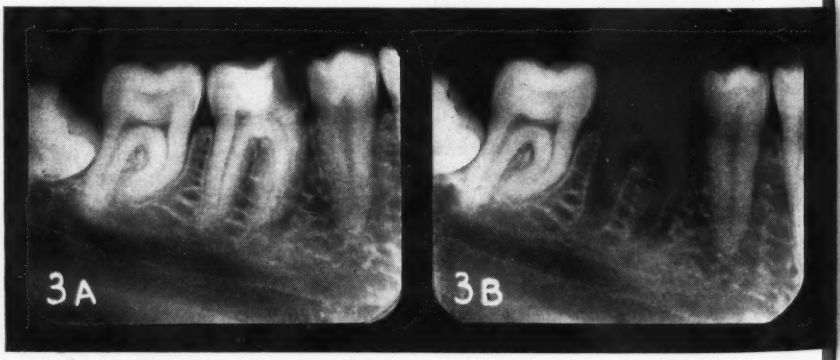
Impactor force can be applied in two directions: (1) into the alveoloradicular relationship of a single tooth and (2) between two or more adjacent isolated teeth. In the latter instance, the teeth are forced apart and the alveolar walls are spread as well.



J, *Lower left lateral, cuspid, and first bicuspid;* **K,** *all teeth separated. (Even though there is evidence of well advanced alveolar pathology, it is best to elevate before forceps application as the efforts on the part of nature towards strong fibrous attachment predispose to retained and broken apexes.)* **L,** *Finish with clean alveoli and ridge.*

M, *Two upper right molars with very intimate antral relation;* **N,** *the molars are separated;* **O,** *last molar removed, other loosened.*

2 (Cont.)—Interdental socket expansion and tooth separation prior to removal.



3—Case where either socket expansion *or* sectioning can be used. The first technique was used here.

Guesswork is almost eliminated in applying pressure with the Impactor. Pressure can be applied in one blow at a time or in a series, and stopped at a touch. This is not the case with physical effort; laboratory tests have shown that the reflex for pressure stoppage must be stimulated before it functions and that meanwhile force is being applied and needless damage done. With the Impactor, control is taken care of in two ways: through the foot rheostat and the withholding of the impactor from the operating area.

The only way to appreciate directly what this instrument can do is either to watch its application in the hands of one who can use it judiciously or to learn its use. The accompanying roentgenographs show in detail what can be done, how it is done, and the cleanness of the finished operation.

In conclusion it can be stated that the judicious application of the socket expansion principle with the Impactor facilitates extractions and causes fewer postextraction sequelae.

113 *East Grace Street.*

ANESTHESIA

for the Oral Surgeon

E. AUBER PEEBLES, D.D.S., Los Angeles

DIGEST

Considerations which should determine the "anesthesia of choice" in oral surgery are commented upon briefly. A practical suggestion is made also for administering sodium pentothal.

Nitrous Oxide-Oxygen

If the blood pressure is normal, nearly so, or below normal, no anesthetic is preferable to nitrous oxide-oxygen. If properly administered (preferably with a sedative such as nembutal or seconal twenty minutes before the operation), it is undoubtedly the safest and most satisfactory general anesthetic for the oral surgeon; and the time limit for the operation is no shorter than under any other agent used for general anesthesia. However, its safety is greatly accelerated by having 5 per cent carbon dioxide in the oxygen for the express purpose of stimulating respiration.

Pentothal Sodium

If the blood pressure is higher than normal, intravenous or procaine block or infiltration should be the anesthetic of choice. Sodium pentothal for intravenous anesthesia presents two outstanding hazards: (1) the relaxation of the muscles including the heart muscle; (2) the danger of aspirating blood or saliva into the air passages. Those who are using sodium pentothal without having oxygen with 5 or 10 per cent carbon dioxide ready to accelerate respiration are risking a fatality. Other disadvantages are: lowered blood pressure and a delay in the recovery of general coordination which necessitates a longer stay in the recovery room.

Despite the precautions necessary, there is no more ideal anesthetic for intravenous administration available to the oral surgeon. From six to twelve or fifteen cubic centimeters of a two and one-half per cent solution of sodium pentothal produce tranquil narcosis. The inhalation of nitrous oxide-oxygen in percentages of 75/25 (the oxygen containing 5 to 10 per cent carbon dioxide) should immediately follow the intravenous injection. The pentothal sodium serves as a basic anesthetic; the oxygen regulates respiration.

For the use of pentothal in oral surgery, I have designed an arm support that is attached to the dental chair. This arm support with ample flexibility facilitates entering the vein: It allows full extension of the arm so that the veins are more accessible and keeps the arm firmly in position while sodium pentothal is being administered.

1052 *West 6th Street.*

I—Intravenous chair-arm attachment in rest position.

SIMPLIFIED TRAYS

for Full Denture Impressions

JACK F. CATHCART, D.D.S., Berkeley, California

DIGEST

Making special, accurate trays of metal, vulcanite, or acrylic for full denture impressions takes much laboratory time and effort. An accurate impression tray of plaster which gives a comparable result can be made in a relatively short time, on the other hand, and because of that material's ease of manipulation, a better effect may possibly be gained.

Procedure

1. A snap impression of compound is made of the maxillary or mandibular edentulous area and a study model poured from it (Fig. 1).

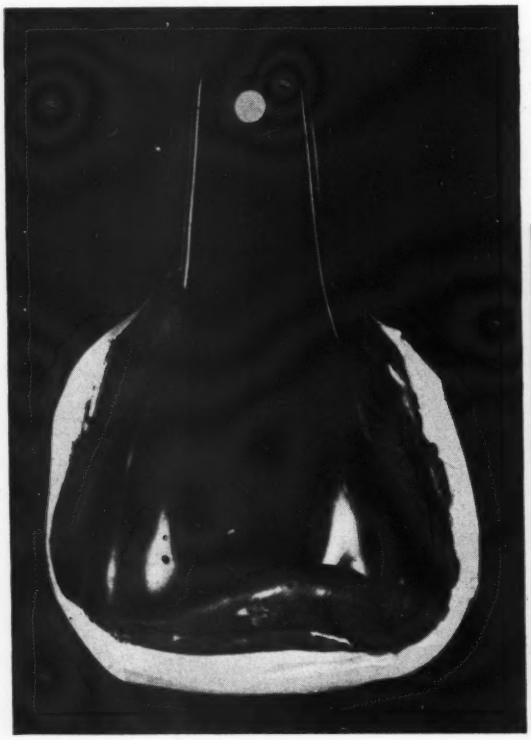
2. The area to be covered is determined by careful study of the patient's mouth and outlined on the model in indelible pencil (Fig. 2).

3. Three to five thicknesses of wet asbestos, the type issued with cristobalite inlay investment, is placed over the study model and trimmed approximately to the outline thereon (Fig. 3).

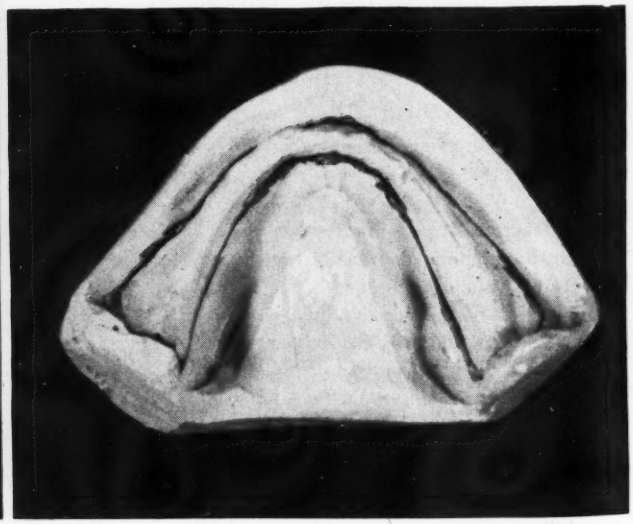
4. A layer of plaster approximately $\frac{1}{8}$ to $\frac{1}{4}$ inch thick is poured over the wet asbestos to form the impression tray. On the lower tray a paper clip can be buried in the anterior region and covered with plaster to make a tray handle (Fig. 4).

5. When the plaster has set, the wet asbestos is removed and the periphery of the plaster tray is trimmed $\frac{1}{4}$ inch short of the outline on the study model (Fig. 5).

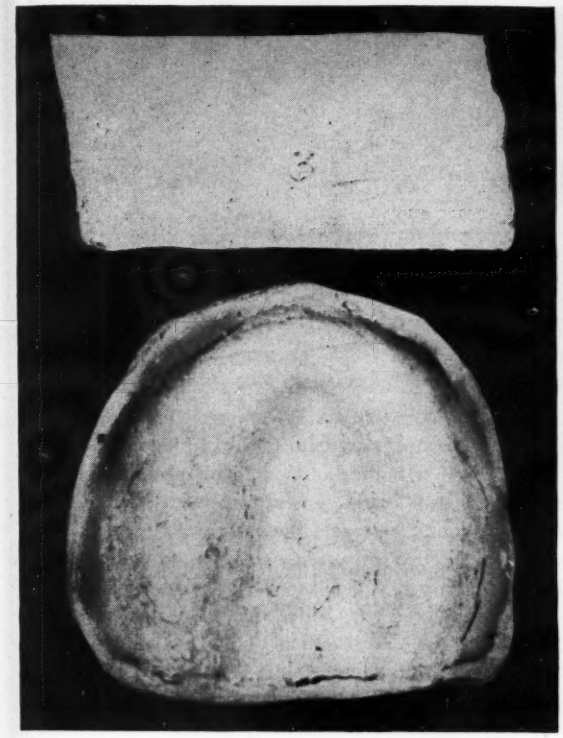
This procedure provides an impression tray which fits the patient's mouth (with an area for impression material that is then roughened to hold hydrocolloid for the final impression) and which does not impinge or pull on any of the muscle attachments.



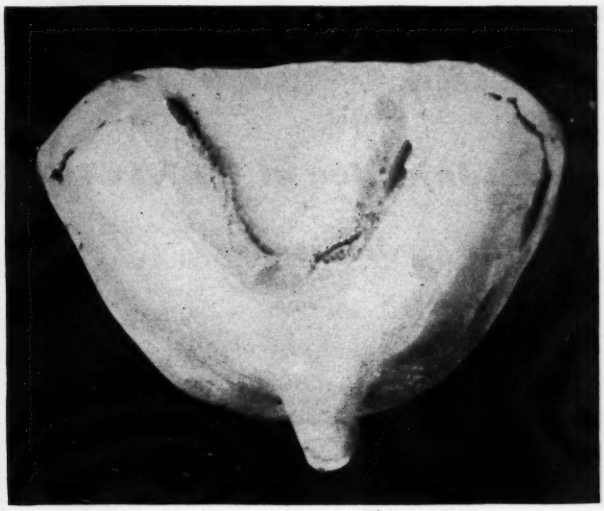
1. ***Compound snap impression poured for plaster model.***



2. ***Outline form on model with indelible pencil.***



3. *Wet layers of asbestos placed on model.*



4. *Layer of plaster on asbestos. Paper clip in place for handle on lower.*

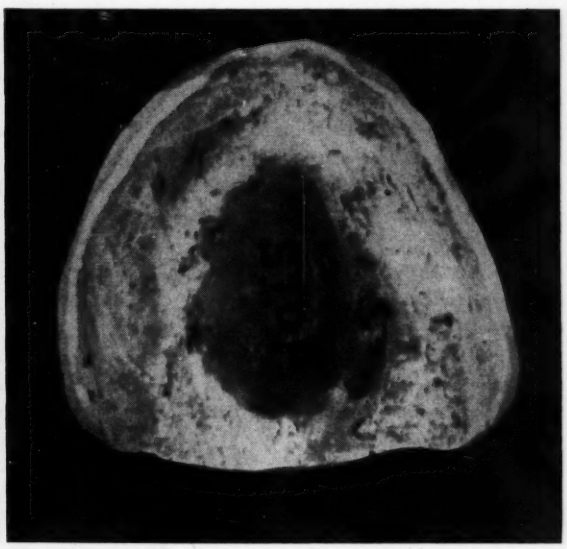
5. *Asbestos removed and tray ready for impression material.*

Final Impression

Before taking the final mandibular impression, the area is dried with gauze. The weight of the tray alone is permitted to hold the impression in place while the hydrocolloid sets.

In taking the upper impression a compound or wax stop ¼ inch in thickness is used in the hard palate area to stabilize the seated tray. This prevents placing the tray too high with a resultant distortion of the muscle attachments. The hydrocolloid is mixed with ⅓ more water than is used in the normal prescribed mix.

701 *American Trust Building.*



6. *Wax stop on upper to steady tray during settling time and prevent impingement on muscles.*

Direct Injection of PENICILLIN *into the Oral Tissues*

LOUIS G. HILL, D.D.S., Toledo

DIGEST

Penicillin has proved to be one of the most valuable agents ever employed in the practice of dentistry. Its use is indicated in all staphylococcic infections with or without bacteremia; it is invaluable in osteomyelitis, soft tissue abscesses, cellulitis, and Vincent's infection; as a preoperative prophylactic to prevent secondary infection following tooth extraction, in cases with a history of rheumatic fever or in rheumatic heart disease and in other conditions in which secondary infections may occur, it may be used in large doses with good results.

In the method of administration suggested here, crystalline penicillin is dissolved in procaine and the solution injected locally. Postextraction pain is prevented and dissipation of the penicillin of the blood stream is avoided by the adrenalin content of the medication which rapidly constricts the vessels.

The technique permits dentists to extract acutely abscessed teeth without waiting for the inflammation to subside.

PHYSICIANS and hospitals have standardized their technique for penicillin therapy but little has been done to establish an office technique for dentists. Oral administration is of some value in dentistry but does not give the results obtained by block or infiltration injections. A few years ago, when penicillin first became available to dentists, we began to develop a technique for injections in and about the mouth.

First Method Used

At first penicillin powder was used with standard saline solutions in doses of 25,000 units per cubic centimeter in mandibular and other block injections and infiltration for the treatment of Vincent's disease, pericoronitis, and cellulitis.

After the solution had been mixed, it was withdrawn in a glass Lok-syringe and injected in the same way as procaine. Injections were made every three hours during the day with good therapeutic results. In areas where the pus had pointed, the needle was inserted and the pus evacuated. The syringe with the penicillin solution was then placed on the needle and the solution injected directly into the abscessed area. Both intra- and extra-oral injections were made. In most cases intra-oral injections are easier for the dentist to make.

Procaine as Solvent

Because many patients complained of pain following the injections, procaine has been substituted as the solvent for the crystalline penicillin: An ampule of procaine 2 per cent with adrenalin 1/30,000 is injected into the bottle of penicillin and immediately withdrawn with the glass syringe. The procaine prevents post-injection pain; the adrenalin causes a rapid constriction of the blood vessels which prevents the immediate dissipation of the penicillin into the blood stream from where it is carried to the kidneys and eliminated. (Other solutions of procaine with 1/50,000 adrenalin and monocaine may be used but the higher concentration of adrenalin is preferred.)

Around-the-clock intramuscular injections produce a more constant blood level but such therapy requires hospitalization. In most cases seen in the dental office three injections daily (9:00 - 12:00 - 3:00) of 100,000 units each will produce good results without the cost or inconvenience of hospitalization.

Penicillin Packs—This solution of penicillin may be applied to Oxycel or Gelfoam and packed in tooth sockets, cystic cavities, or sinus openings. Such packs do not have to be removed and are absorbed with the blood clot. They will, in addition to preventing bacterial action, cause active hemostasis.

Supplementary Sulfa Medication—In order to combat any gram negative flora, sulfa drugs may be used in a powder form in a blower and blown into the open cavities before the penicillin packs are placed. Where indicated, sulfa drugs prepared for oral administration and penicillin troches (or penicillin prepared for internal administration) may be used orally between injections and during the

(*Continued on page* 612)

The EDITOR'S *Page*

THE DENTAL pulp is a highly specialized tissue. It has a two-fold function—the formation of dentine and the reception and conduction of nerve impulses from the tooth. In common with other highly specialized tissue, the pulp has a low-order power of regeneration. The defensive mechanism of this tissue has always been considered to be poorly developed. The pulp functions in an unfavorable anatomic environment, being closely confined within rigid walls of dentine. In an inflammatory process, there is scant room for the tissue to expand. The result is pain from pressure often followed by strangulation of the blood supply and necrosis.

Because the pulp is encased within solid walls, the pulpal vessels have no facility to develop a collateral circulation if subjected to traumatic injury, inflammation, or thrombosis. The internal integrity of the tooth is endangered by bacterial attack from without. The bacteria invade from the carious process through the dentinal tubules. There is also some reason to believe that the pulp, in common with other tissues that are supplied by end-arteries, is subject to hemotogenous irritation from bacteria, toxins, and emboli. The pulpitides that we occasionally encounter in sound teeth free from caries and restorations may be explained in terms of blood-born invasions. The pulp is connected with the general circulatory system. An irritant may be carried to or away from this tissue in the circulating blood.

In the past there was a grim finality regarding the treatment of the pulp. This tissue was often needlessly sacrificed by the chemical necrotizing method of arsenic devitalization. When arsenical devitalization was proved a dangerous practice, other methods of pulpal evulsion were developed, notably removal under cocaine pressure anesthesia and the local or block injection of procaine. Blayney demonstrated years ago at the University of Illinois that pressure anesthesia was a method that actually injected bacteria from the coronal to the apical portion of the tooth. Although pressure anesthesia might be acceptable for surgical purposes, it was not a good biologic procedure because of the danger of implanting bacteria in the periapical tissues which frequently produced root end disease.

Blayney's work demonstrates that in these cases it was not the pulpless tooth per se that produced the apical infection but rather the unintelligent anesthetic and surgical procedure that was designed for pressure anesthesia. Good present-day practice requires that pulps be removed under some form of local anesthesia, under aseptic conditions, and with a minimum of physical or chemical trauma.

Clinicians should plan their treatment differently for the pulp that has been traumatically exposed and for the one that has been exposed by caries. The vital pulp that is exposed by an accidental injury or by an accident during operative procedure has an integrity of self-defense that should be considered in treatment. Such an exposure may often be successfully treated by using a protective covering of zinc oxide and eugenol, sealing without pressure, and keeping under observation and testing frequently for vitality. Many cases of this type have remained vital for years, if no irritating drugs have been used and if the sealing has been done immediately without pressure and under clean conditions. The pulp exposed by the infectious process of caries is a contaminated and diseased tissue and cannot be treated by the conservative method of capping. Such pulps must either be removed and the canals carefully sealed or the teeth must be extracted.

The factors, according to Manley,[1] that must be considered in evaluating pulp treatment are the "Size and depth of the cavity, the age of the patient, and the degree of vitality of the individual pulp . . ." In general, the larger and deeper the cavity, the more likely that the pulp is infected. The younger the patient, the wider apical foramen, the better the blood supply, and thereby the prognosis; the higher general tissue tone and cellular integrity, the more favorable the vitality of the pulpal tissue. Each pulp that has been exposed must be evaluated separately and in biologic terms.

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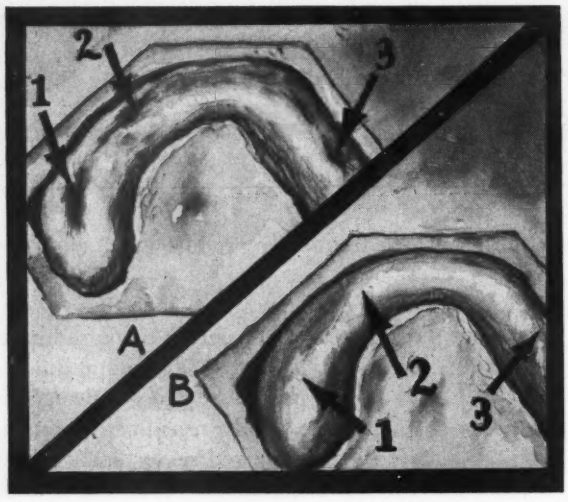
[1]Manley, E. B.: Some Observations on the Defence Mechanism of the Dental Pulp, Dental Gazette 14:31-34 (September) 1947.

Clinical and Laborator

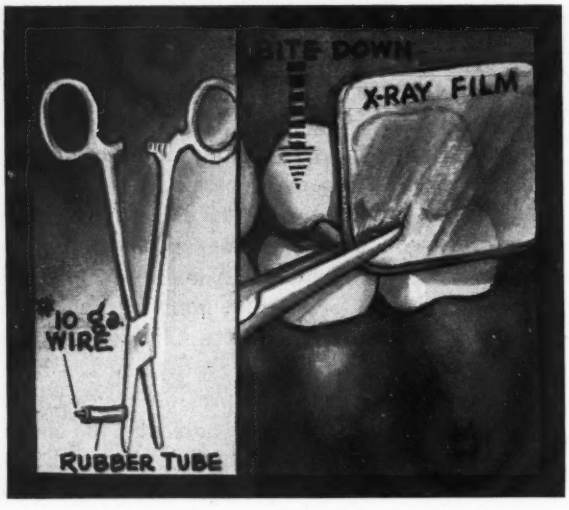


1

Preparation of Casts Prior to Processing Full Dentures

W. H. Snoddy, D.D.S., Salt Lake City

1. The depressions in the cast (A) are filled with a thin wash of artificial stone applied to the wet cast (B). A denture processed upon a smooth cast will be kinder to the tissue and will act as a matrix which, in time, will mold the tissues to a better and more regular ridge form.

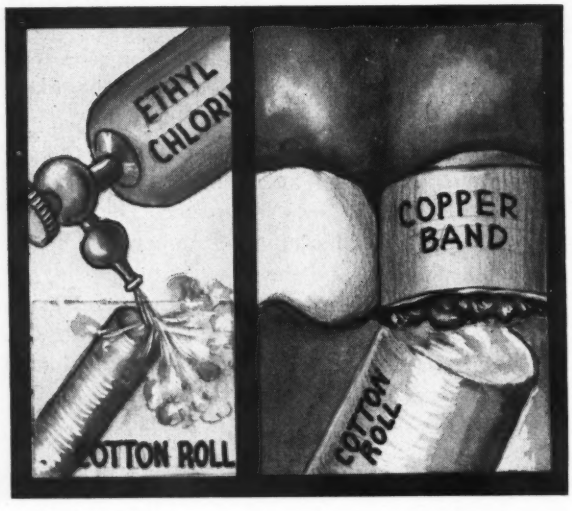


2

A Rigid Film Holder

T. A. Leach, D.D.S., Hutchinson, Kansas

2. A piece of 10-gauge wire is soldered to one beak of a hemostat. A piece of rubber tubing is fitted over this metal projection. A corner of a dental x-ray film is engaged in the beaks of the hemostat. The film is placed in proper position and the patient is instructed to close the teeth firmly on the rubber tubing.



3

Chilling Band Impressions

R. M. Way, D.D.S., Galesburg, Illinois

3. After the copper band and modeling compound are in position on the tooth, a cotton roll that has been sprayed with ethyl chloride is held against the impression to give a quick cooling effect and to permit immediate removal.

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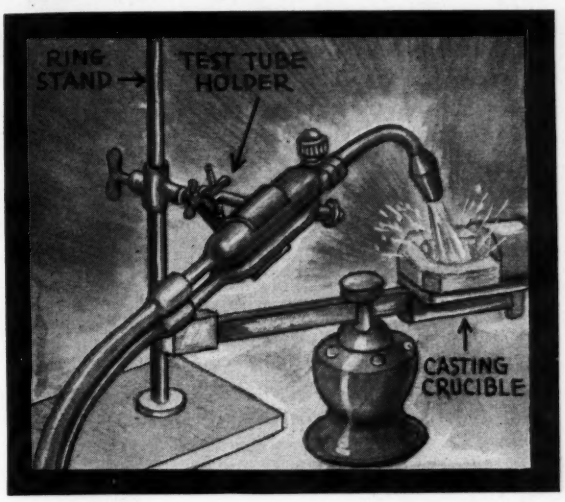
UGGESTIONS . . .

A Rigid Blowtorch Holder

Joseph Berenbaum, D.D.S., Riverside, California

4. A fixed position for a blowtorch is advantageous: It allows freedom for both hands to remove the casting ring from the furnace; it permits the molten gold to be cast before the metal, ring, or mold are cooled. A fixed holder may be constructed by using an adjustable test tube holder on a ring stand.

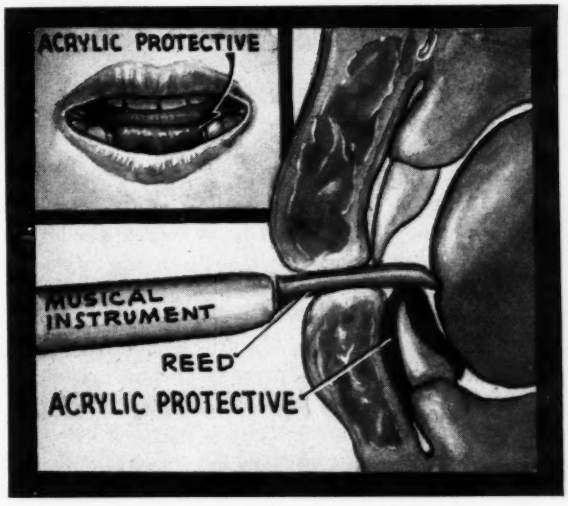


4

An Acrylic Protector for the Teeth

R. M. Miller, D.D.S., Chicago

5. Musicians who play reed instruments are subject to traumatic irritation of the lower lip and lower anterior teeth. A simple and inexpensive protective may be constructed by molding a piece of baseplate wax over the lower anterior teeth, trimming, removing without distortion, and processing in acrylic resin.



5

Combined Modeling Compound and Alginate Impression

F. F. Slaff, D.D.S., Passaic, New Jersey

6. An individual modeling compound tray is made for each case. This tray carries the alginate for the final detailed impression. The procedure is as follows: The teeth are covered with several layers of gauze; the gauze is lubricated and a modeling compound impression is taken; the impression is chilled and removed and the gauze is removed. The resultant modeling compound tray is used to carry the alginate to position to record the details of the teeth. This combined impression assures accuracy.

6

suitable illustrations; write a brief description of the technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 610 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

MEDICINE and the Biologic Sciences

Hypertension

The cause of high blood pressure is unknown. Most observers regard hypertension as a symptom of the disease. However, it is a symptom about which a great deal has been learned. It is noted that the most common complication of hypertension is heart failure.

Hypertension is classed as primary or essential hypertension and secondary hypertension. Nephritis, pyelonephritis, adrenal growths, pituitary tumors, and endocrine disturbances may cause hypertension. When it arises as a result of these causes it is considered secondary.

In the early stages of hypertension there are no symptoms. The only abnormality is a heightened blood pressure. As the disease progresses the heart enlarges, the arteries harden, and other complications arise.

There is a benign and a malignant form of essential hypertension. Patients with the benign form usually develop symptoms in the forties or early fifties after having an elevated blood pressure for five, ten, or even fifteen years. Headaches, shortness of breath, chest pains, visual disturbance, and a feeling of malaise gradually appear. These cases generally terminate in heart failure, stroke, or uremia years after the onset of the disease.

The malignant form is really only a phase of essential hypertension. It differs from the benign only in degree of severity, speed of progress, and ultimate outcome. Arteriosclerosis is the chief pathologic change in both the malignant and benign types with the renal arteries and arterioles being mainly involved. In the malignant type the arteriosclerotic process is more widespread and involves even the smallest arteries and arterioles.

Since the year 200 B.C., the conception of the role of the kidney in the production of hypertension has varied. Present-day concept regards the kidney as only a contributing factor to a disorder which is constitutional involving the kidneys, the vascular bed, and the cerebral centers.

The prognosis of the individual case should not be based on the height of the blood pressure. Some persons live for years with a comparatively high pressure. However, data from large numbers of cases show that the higher the blood pressure the worse the outcome.

The height of the blood pressure fluctuates depending on the condition of the heart, emotional strain, and peripheral resistance. When the pressure becomes fixed at a high level, above 220 systolic and over 130 diastolic, the prognosis is unfavorable.

The presence of hypertension is determined by a few simple examinations. Blood pressure determination is essential. Marked fluctuations indicate that the blood pressure has not become fixed and probably the hypertension is more functional than organic for the time being. Examination of the cardiovascular system is important since heart failure and heart disease are the commonest complications of hypertension.

A study of the kidneys yields significant information for prognosis and treatment. Few cases have complete kidney failure and die of uremia. An ophthalmoscopic examination reveals the condition of the arterioles in the retina. These blood vessels originate directly from the brain and probably show the same changes as the vessels in the brain.

Murphy, F. D.: Hypertensive Heart Disease, J. Michigan M. Soc. 46:310-317 (*March*) 1947.

Early Ambulation

In the last ten years there has been an increasing interest in postoperative activity. Such activity may be given in bed or out of bed on the day of surgery or on the first postoperative day.

A normal person, when placed at bed rest, goes into a negative nitrogen balance and both his reaction time and coordination time decrease. The blood volume decreases ten to twenty per cent and the heart size is decreased. Calcium balance becomes negative and there is an increased loss of certain vitamins. These changes may occur when nothing at all is done to the patient and while he receives a balanced diet which is fully adequate when he is ambulatory.

Depending on the type of operation, functions disrupted by surgery usually correct themselves so that the patient is able to get around by the sixth postoperative day.

Memory, manipulative skill, cortico-retinal responses, and muscle strength return to normal in one or two days depending on the operation and the anesthetic.

Metabolic functions are measurably damaged. Liver damages appear within an hour after the operation and disappear within six days for light surgery. For heavier surgery these changes are more intense and persist longer. Nitrogen balance becomes negative after surgery and persists until the patient takes a full diet.

Early ambulation has a definite beneficial effect on these changes. Both preoperative and postoperative activities are of value.

Activity brings more comfort and

helps the patient to feel better. The amount of nitrogen loss is reduced, there is less weight loss, the cardiovascular response is better and less nursing care is required.

In addition to the patient side of the picture early ambulation means a more rapid turnover of hospital beds. This is important economically to both patients and hospitals.

Calloway, N. O.: Early Ambulation, Hospital Topics & Buyer 25:31 (*May*) 1947.

Speech Correction

Speech is a faculty that everyone has to learn for himself. One in twenty does not learn properly. Among these are the stutterers, the cleft palate cases, the lispers, and the people with articulation defects.

For the simple reason that speech defects do not show, they have not received the attention that some visible deformities have received. In fact, the movies and radio have exploited stuttering as being funny.

Speech defects are correctable for the most part. The science of logopedics, meaning correction of speech, is bringing dramatic help to many. The bulk of the work consists in having the person make the correct sounds in front of a mirror. Capable instructors need unbelievable patience as individual attention is required over a long period of time.

There are four principal factors contributing to speech defects. First is the damage to the central nervous system. The spastics and the war veterans with severe head injuries are examples of this. Mechanical defects, such as cleft palate and damage to the larynx, account for the second group of cases. The third group consists of persons with nutritional disorders such as vitamin deficiencies. And finally there are some speech disorders caused by psychologic factors.

Stuttering may result from any of these four causes. It strikes one out of every hundred persons. An odd observation is that the Navajo Indians and diabetics are never affected. Such an affliction is a severe handicap as figures show that the stutterers have thirty to forty per cent less earning power than people with normal speech.

Parents often feel that a child will outgrow stuttering. Most authorities disagree. The speech should be nearly perfect by the age of three. Corrective steps should be instituted by four if the speech is not fixed. After this there is only a fifty per cent chance than the faulty speech will correct itself.

Stuttering is an extremely complex process governed by a number of factors. There is no secret cure because no one knows what causes it. Two types of stuttering are recognized. In one the sounds are repeated due to a spasm of the speech organs. In the other type the mouth gapes open but no sounds issue forth. This is due to a spasm of the respiratory organs. The cause of the spasms is unknown.

A well-defined impulse from the brain precedes the spasm. These surges of power are measurable by the electro-encephalograph. The victims are often aware of the impulses and can be taught to use them as a signal not to stutter. An effort is made to secure relaxation. When relaxation becomes automatic, stuttering stops. This is particularly true of children. With adults the chances are not as favorable; however, no case should be considered hopeless.

Spastics present the greatest problem in speech correction. They have little voluntary control of muscles. Their intelligence is equal and often superior to that of average children. They must first attain some degree of control over the body muscles. An effort is made to teach walking no matter how difficult. The same applies to speech. The spastic will never have free normal speech but even a crude speech is worth the effort.

Carhart, Raymond: Differences in Speech, Ann. Otol., Rhin. & Laryng, 55:233-266 (*September*) 1946. *Pauls, M. D.; Haskins, H. L., and Hardy, W. G.: Speech Correction, U. S. Navy M. Bull. supp., pp.* 232-248 (*March*) 1946.

Streptococci (Bacteriology)

The term streptococcus is based on a morphologic concept and includes all cocci that occur in chains and are insoluble in bile. There are many variations in the streptococci. Some produce deadly diseases and others are nonpathogenic. As a whole the streptococci are probably responsible for more illnesses and are capable of causing more different kinds of diseases than any other group of organisms.

Typical streptococci occur as cocci of variable size arranged in long or short chains. Within the chains they may have a tendency to be arranged in pairs. They are nonmotile, gram positive, and do not form spores.

The majority of streptococci grow best in the presence of oxygen but may grow without it too. They grow well on fairly rich media within twenty-four to forty-eight hours. Body temperature is best suited for their growth but a range of 15° Centigrade to 45° Centigrade will allow growth.

Streptococci are not soluble in bile and do not ferment insulin. These are characteristics differentiating them from the pneumococci.

It is possible for streptococci to remain alive in sputum or other excreta for several weeks and they may live in dried blood or pus for several months. A temperature of 60° Centigrade for thirty to sixty minutes destroys them. Fifteen minutes exposure to 1:200 carbolic acid solution, 1:200 bichloride solution, 1:1000 tincture of iodine, or 2 per cent mercurochrome will destroy them.

The most useful method of identification of streptococci is based on their action on blood-agar plates. After the plates have been inoculated for twenty-four hours or longer, three distinct groups of growths are recognized.

The alpha or viridans type is a colony surrounded by a green halo; hemolysis is slight or absent. The beta or hemolytic type is a colony surrounded by a clear colorless zone of hemolysis. And the gamma type

shows neither hemolysis nor color change. There are several strains within the types.

As a rule the hemolytic type is the most virulent and is associated with acute fulminating infections. The viridans type is most often associated with chronic infections. Many, but not all, of the strains of the gamma type are nonpathogenic.

The most common cause of acute endocarditis, septicemia, and puerperal sepsis is streptococcus hemolyticus. It may cause pneumonia, boils, abscesses, cellulitis, peritonitis, tonsillitis, osteomyelitis, empyema, and otitis media. It is responsible for the majority of cases of bronchopneumonia, complicating whooping coughs, measles, and influenza.

Subacute bacterial endocarditis is usually caused by streptococcus viridans. It may also cause root abscesses of the teeth, infections of the nasal sinuses, and many focal infections.

Carter, C. F.: Microbiology and Pathology, ed. 2, St. Louis, C. V. Mosby Company, 1939, *pages* 331-337.

Pernicious Anemia—Physiologic Aspects

Pernicious anemia derives its name from the fact that prior to 1927 it was as fatal as inoperable cancer. The condition is characterized by a decrease in the red blood cell count for a time. Frequently there is a remission with a return of the count toward normal. Then a relapse occurs which is more severe than the first attack. The count gets lower with each attack and death occurs after two to five years.

This was the inevitable course until two Harvard physicians, Minot and Murphy, fed large quantities of liver to patients so affected. They noted amazing recoveries. These findings have been confirmed by many investigators since that time.

The blood count rises within a few days after liver feeding is started. In a few weeks the count may even reach the normal and the patient is quite well. The liver does not cure the condition as the anemia quickly returns when the liver intake is halted.

Apparently the primary defect lies in the formation of the red cells in the bone marrow. The stroma portion of the red cells is defective; the cells are abnormal in size and shape and extremely fragile. The manufacture of hemoglobin is not a primary defect. In fact, pernicious anemia cells contain more than the normal amount of hemoglobin. The total hemoglobin is reduced because the red cells are so few comparatively.

The anemic cells are destroyed more rapidly than usual as evidenced by the fact that bile pigment, the end product of hemoglobin disintegration, is increased in quantity in the feces.

Liver has been subjected to many tests in an effort to extract the material effective in controlling pernicious anemia. Such a material has been found. The chemical nature is unknown but it is known to be iron- and vitamin-free. It is not a protein even though it contains some of the elements found in proteins.

From available evidence it is apparent that the production of the vital material has some relation to the diet and to the stomach.

Some protein component of the food is apparently acted upon by a specific component of the gastric juice of the normal stomach. The product formed is then stored in the liver. This is the active principle which effectively prevents pernicious anemia. In persons with pernicious anemia it appears that the specific secretion of the stomach is lacking.

Carlson, A. J., and Johnson, Victor: The Machinery of the Body, Chicago University of Chicago Press, 1947, *pages* 110-116.

Blood Bank

In the larger hospitals and clinics there is usually a blood transfusion service committee whose duty it is to advise on all procedures and problems relating to blood transfusion services. This includes problems of the actual operation of the blood bank, arrangements for procurement and care of the blood donors as well as the clinical pathologic laboratory work necessary for the examination of blood.

The committee also has charge of the clinical use and administration of blood transfusion and investigation of transfusion reactions. The use of blood plasma and serum albumin comes under the jurisdiction of the committee.

Blood banks are usually open and the greater part of the day and are staffed by physicians, nurses, and technicians. All records of donors' and recipients' blood groupings and Rh factors and other pertinent facts about donors are on file at the bank.

Blood donors undergo phlebotomy at the bank. In most instances the blood of the donors is taken at the bank for the necessary tests.

Blood is drawn into vacuum bottles containing a special mixture of dextrose, sodium citrate, and citric acid. This allows storage of the blood up to twenty-one days. However, blood is seldom kept that long before it is used. Each hospital tries to carry an adequate supply to meet its emergency needs.

Ambulatory patients may be given blood transfusions at the bank and observed for several hours.

Transfusion reactions are carefully watched and detailed observations made. From these notes treatment for future reactions is outlined and changes in administration proposed.

Seldon, T. H.: Operation of a Blood Transfusion Service, M. Clin. North America 31:785-786 (*July*) 1947.

The Future of the Hospital

Clinical investigation is being conducted in the hospitals with an ever-increasing importance to medical science. There is no doubt that the hospital will continue to be the leader in this field.

Patients are primarily interested in treatment. Investigative studies give rise to new forms of treatment.

Both the physician and the scientist glean valuable information about etiology and prognosis.

In the larger hospitals full-time clinicians are available to carry on clinical investigations which originate at the bedside. One of the essentials for adequate research and study is a good working library. Books and journals are necessary to determine what has already been accomplished.

Adequate records form an integral part of hospital procedure because the description of previously unrecognized conditions often depends on the observation of numerous cases and not on planned investigation.

The laboratories serve to complete and supplement the data gathered in clinical work. The cooperation of the physician, scientist, and scholar is the key to advancement in knowledge.

A preventive medicine clinic might well be part of the hospital service. Preventive medicine has a broad conception; it should include all activities to increase health. An effort must be made to construct as well as reconstruct health. One of the chief objectives of preventive medicine is to reduce things harmful in the environment and to increase the body's immunity.

Control of infectious diseases is increasing but the chronic progressive diseases associated with later years of life are becoming greater problems. Hospitals are concentrating more and more on the health problems of older persons.

One of the means of meeting these problems is the early detection of disease. This requires more than the ordinary routine physical examination. It requires a periodic health consultation. Such a consultation means a detailed history and complete consideration of the patient as a person, including an analysis of such living habits as diet, rest, and work.

Many of these investigations demand the services available only in the hospital. All the laboratory tests and complete observation are obtained here to best advantage.

Dietary factors are being recognized as assuming greater importance. The most fertile field in the world of medical research today is nutrition. Along with the medical problems associated with diet, scientists are aware of the relationship of nutrition to dental caries. "Dental caries is the most widespread nutritional defect: One or more nutritional factors involved may be harmful or the lack of a factor or factors may be causative."

There are a great many other investigations being carried on in the hospitals today. Altogether they make the hospital an institution of increasing value to both medicine and dentistry.

Minot, G. R.: The Hospital—A Look Ahead, New England J. Med. 236:563-566 (*April* 17) 1947.

Measurement of Capacity of Maxillary Sinus

FOR MANY years B. R. Dysart[1] has been measuring the amount of irrigating fluid that the maxillary or sphenoid sinus will hold before overflowing.

Method

The only equipment needed, in addition to that employed for sinus irrigations, is a glass syringe (5 to 10 cubic centimeters) attached to the cannula.

Injection—1. After the sinus has been entered, the patient's head is inclined forward so that fluid will flow out easily into a basin.

2. The irrigating solution is injected slowly.

3. When the first few drops flow out into the basin, the number of cubic centimeters injected is noted on the syringe. The solution can then be aspirated for examination of the type of cells present or for culture.

Irrigation—The irrigation can be completed with the use of the syringe, or a large metal syringe or a pressure bottle may be used. With irrigation of the sphenoid sinus, the first drops of the overflow go down the patient's throat and he is instructed to make some sign when this occurs.

Results

The method has proved more useful in the study of the maxillary sinus than in that of the sphenoid sinus.

1. The capacity of the normal maxillary sinus varies but averages 12 cubic centimeters in women and 15 cubic centimeters in men.

2. If the sinus overflows almost at once, it is filled with pus, mucus, thickened mucous membrane, polyp, tumor, or a combination of these. A study of the cell-types in the secretion removed may indicate the nature of the lesion. The method has also proved of value in estimating the amount of mucosal thickening in chronic sinusitis.

—From *Medical Times* 75:170-171 (June) 1947.

[1]Dysart, B. R.: Measurement of the Overflow Capacity of the Maxillary Sinus and Its Significance, Arch. Otolaryng. **45**:173 (February) 1947.

Early Diagnosis of Oral Cancer

THERE IS a widespread fatalistic tendency to "give up in despair" when oral cancer is discovered. The growths are difficult to handle; but instead of pessimism the difficulty should stimulate us to increase our efforts toward earlier diagnosis.

As soon as the local lymphatic system is invaded, the prognosis becomes more grave. It is usually considered that invasion of the regional lymphnodes will reduce the five-year survival rate about 50 per cent.

The authors reporting a series of 145 cases[1] have the "impression that infection stimulates tumor growth."

—From *Medical Times* 75:231 (August) 1947.

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[1]Lawrence, E. A., and Brezina, P. S.: Carcinoma of the Oral Cavity, J.A.M.A. **128**:1012 (August 4) 1945.

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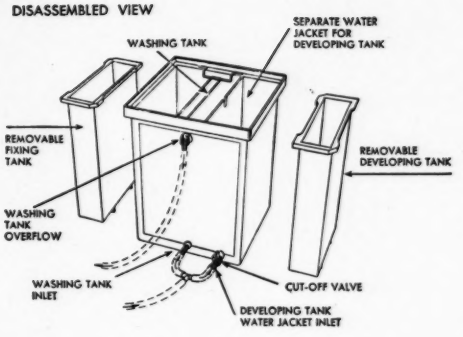
New...

KODAK DENTAL PROCESSING TANK

with more positive temperature control



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To: Clinical and Laboratory Suggestions Editor
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NEWS AND VIEWS OF VITALLIUM

Tear Duct Tubes

Now it's Vitallium tear duct tubes! More properly they are called naso-lacrimal duct tubes and are placed in the head to maintain drainage from the eye into the nasal passages. As a result of a head cold, it may happen that the tear ducts which drain the tear sacs become clogged. This means either cutting through the nasal bones to relieve the congestion, or inserting a Vitallium tube. Silver tubes had been used, but often disintegrated or caused tissue reaction. Vitallium tubes, however, cause no reaction and have been used with success by many ophthalmologists since they were reported in medical literature by Dr. W. E. Muldoon in December 1945.

CLEAN • BRIGHT

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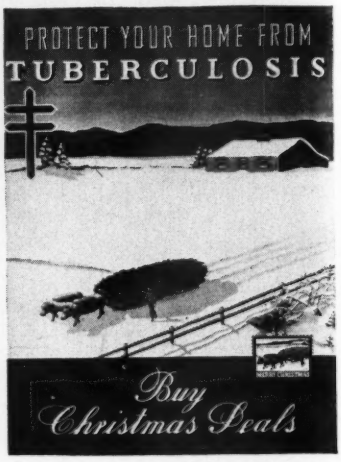
Direct Injection of Penicillin Into the Oral Tissues

(*Continued from page* 600)

night. Administration is continued until the temperature of the patient is normal and all signs of infection are gone.

Comments

The only additional equipment that any dentist has to buy is a 3 cubic centimeter Yale B. D. Lok-syringe and some inch-and-one-half number 21 B. D. needles. The crystalline peni-



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cillin G sodium may be purchased at the drug store in 100,000 unit bottles. It does not require refrigeration in the powder form and will keep about a week in the refrigerator after it is mixed. (It is better, however, not to inject the procaine solution into the bottle of penicillin until the dentist is ready to use it. Furthermore, better results will be obtained if the full dose is used; small repeated doses tend to make the organisms resistant to the action of the penicillin.)

Conclusion

With this technique, dentists who are not trained in general anesthesia can extract acutely abscessed teeth without waiting for the inflammation to subside. There is no better treatment for the abscessed condition than the administration of penicillin. After it is injected and procaine has produced anesthesia, infected teeth may be removed without additional treatment unless further penicillin therapy is desired.

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Contra-Angles

State of the World . . .

With the Marshall Plan for world help, the United States government will again be peering over the shoulder of every businessman in the country. Once again we will have controls, scarcities, and priorities—all the evil impediments of the NRA, the OPA, and the other alphabetical agencies. In the attempt to forestall the spread of Communism abroad (and Communism *should* be kept out of the rest of Europe and the United States), we will return to business operations here at home under the planned economic methods of the socialistic state. In the theory that we will be preserving freedom for other peoples in the world, we will be required to sac-

In your ORAL HYGIENE this month

Make Patients Want *Your* Dentistry

Doctor Douglas W. Stephens, in his article, "Make Patients Want *Your* Dentistry," says:

"If we of the dental profession are to keep our offices filled with paying patients, we must make the public want our services as much as or more than they do new cars, washing machines, radios, and all the other products being rushed to a goods-hungry market."

He explains some of the difficulties of such a "sales" job, summarizes the reasons why people are reluctant to "buy" dentistry, and gives concrete suggestions as to how the dentist can use sound sales psychology to stimulate greater interest in dental health and dental care.

★ ★ ★

More and more dentists are using before-and-after photographs in explaining proposed dental treatment to their patients, and many practitioners will be grateful for Doctor Packtor's simplified photographic technique described in the article, "Dental Photography."

★ ★ ★

"When Were You Last a Dental Patient?" Whenever it was, you probably reached much the same conclusions that Doctor Charles L. Meistroff describes in his article . . . *But*—have you remembered the good resolutions you made at that time to treat your patients as you would like to be treated?

★ ★ ★

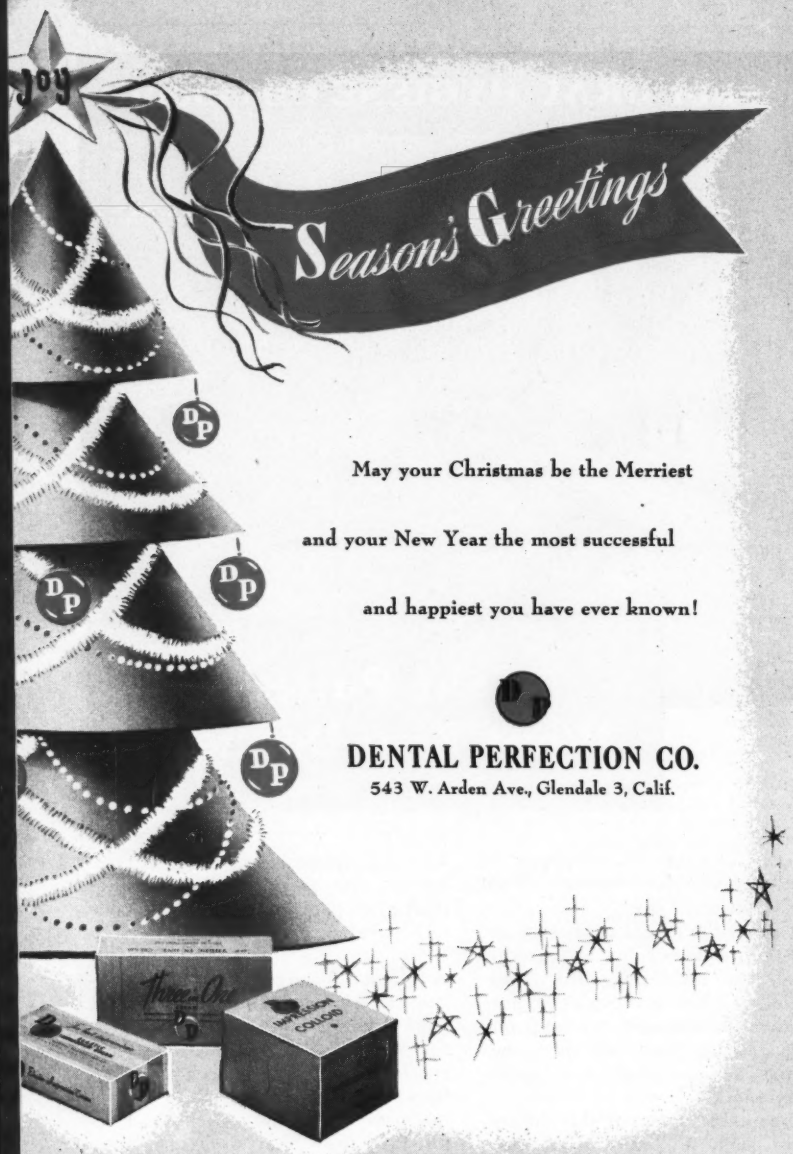
"What's Wrong With Dentistry?—Nothing Except Dentists"—Doctor John J. Berg may make every dentist squirm a little as he reads this article . . . There's no check on a dentist's everyday dental ethics except that provided by his conscience. Doctor Berg feels that sometimes dentists' consciences take a short "breather"—to the detriment of the practitioner, the patient, and the profession itself.

★ ★ ★

Is the Veterans Administration's dental program a foretaste of socialized dentistry? . . . Doctor S. V. Weller describes the "huge blunder we are wading through right now" and warns that we should "watch our step, and look a little harder before we leap into another situation like this last one."

★ ★ ★

Do you "X-Ray to Prevent Embarrassment," as Doctor Randle Luten suggests? You can avoid complaints from patients by taking roentgenograms as a check on your dental procedures.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rifice many of our own economic freedoms.

In time, if we do a good job of spending with our billions of dollars, we will make Europe strong. With return to strength, the old national jealousies will be activated and with the new vigor another war will be in the brewing.

No one except the frigid at heart would want to see starvation and privation in Europe, particularly among the brave people who have withstood aggressions and who have suffered under dictators. But is it our job to save the world and, in the trying, lose our own kind of social and economic system?

I do not have the answers and I am afraid that the planners in Washington are as ignorant as I on the subject.

Tribute to Weston A. Price . . .

It is satisfying to know that sometimes a man is appreciated and rewarded in his own time and among his contemporaries. From the day, fifteen years ago, when I first visited Weston Price in his laboratories in Euclid Avenue, Cleveland, I have known that he was one of the great men of our profession.

Weston Price had the imagination to conceive big things, the strength and resources to carry out large projects, the courage to express his convictions. It will be fifteen years in March since the series, WHY DENTAL CARIES WITH MODERN CIVILIZATION? by Doctor Price began in this publication. Then he was known favorably and with respect within the dental profession. Today he is a revered figure wherever biologic scientists meet. No living dentist is quoted as widely in the present-day scientific literature.

A particularly fine tribute is given Weston Price by Jonathan Forman, M.D., the President of Friends of the Land.[1] Every dentist should be proud that these fine words are written about one of his colleagues:

"The American people have come

[1]Forman, Jonathan: Tribute to Weston A. Price, D.D.S., J. Am. Acad. Applied Nutrition 1:29-30 (Summer) 1947.

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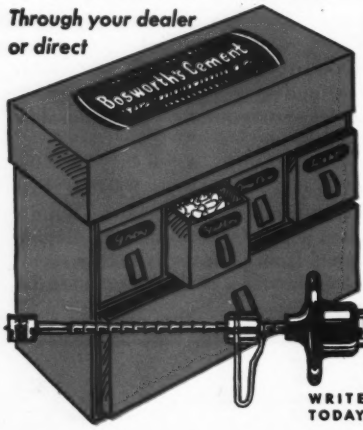

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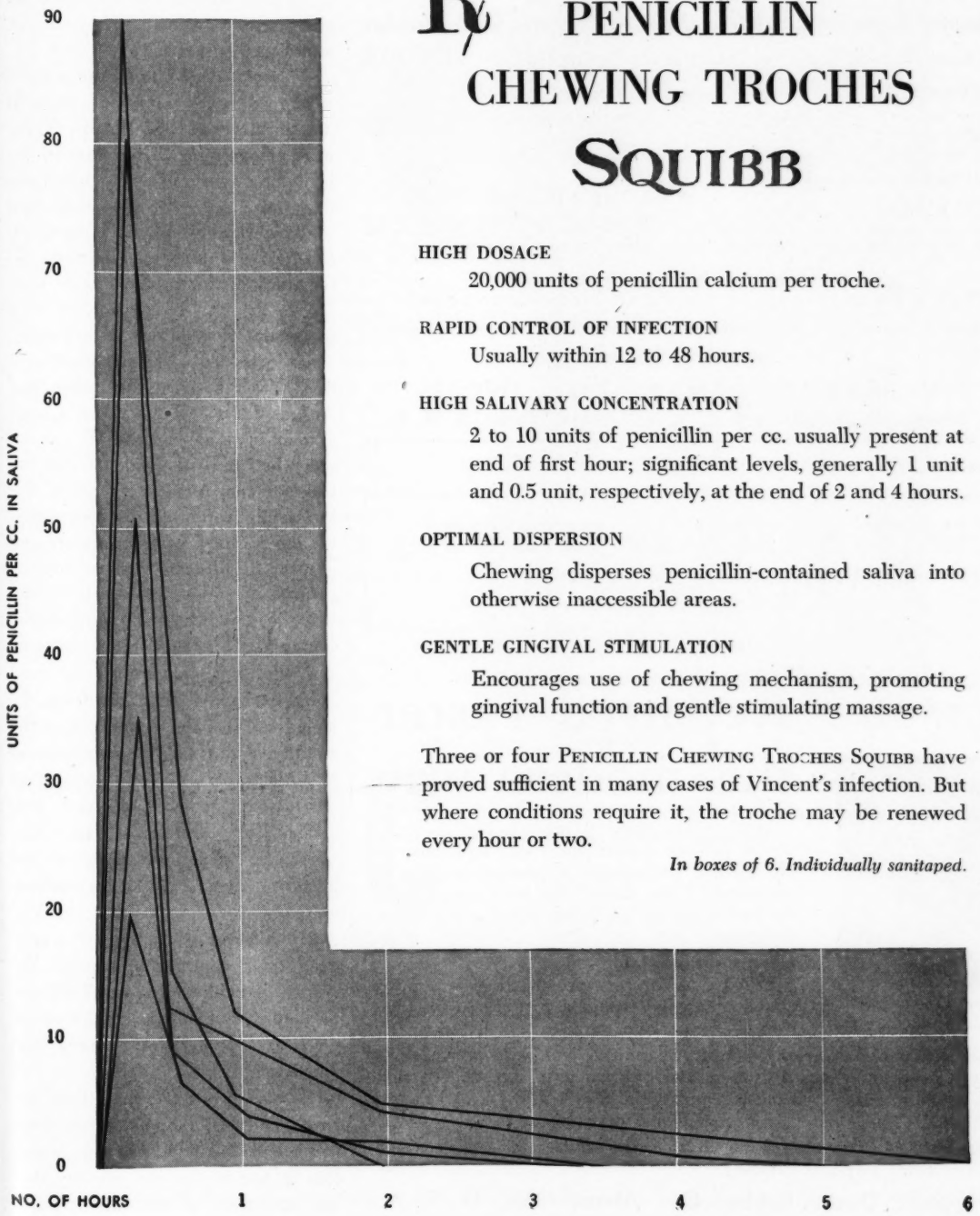

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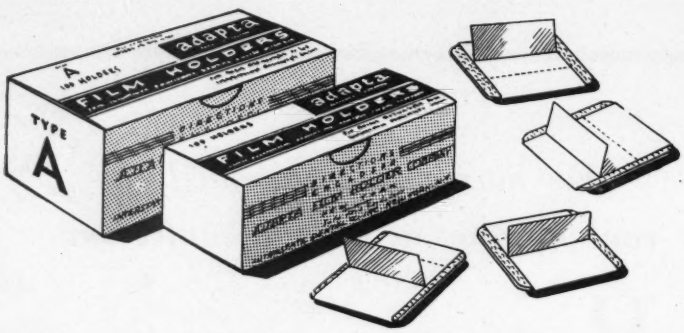

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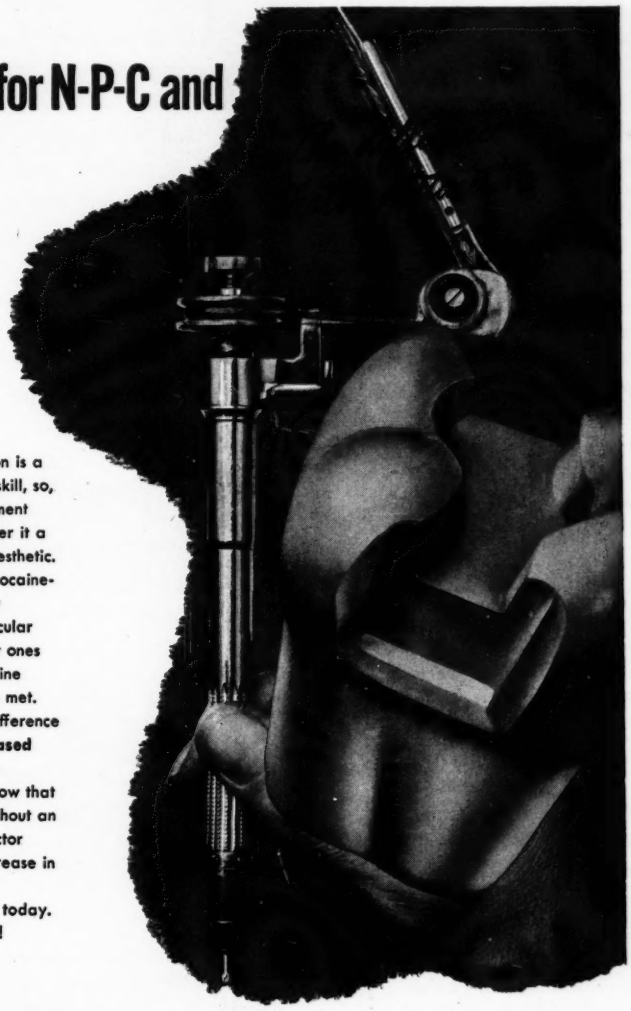
to the place where 15 persons working on the land can produce the food and fiber for themselves and 85 other individuals living in town. In making this migration from the farm to the city, the problems of harvesting, processing, transporting, and storing have been solved without regard to the retention of the essential elements. Knowledge of vitamins, vitagens, enzymes, and minerals came along after our methods of preserving and distributing food stuffs were well established customs.

"Associated with this change there developed many signs of physical deterioration of our people. These were embarassing in the light of the brilliant discoveries about infectious diseases. Among the most important of these signs of physical degeneration was the decay of our teeth. To the study of this problem came Weston A. Price, D.D.S., who had what too many of our highly trained specialists lack today, an appreciation of that which seemed reasonable and natural. He was blessed with a large amount of common sense. He was not one who 'knew too much about too little' to have any concept of the social implication of his discoveries. On the contrary he asked nature and nature told him. He went among the primitive peoples of the earth to find why they had little or no tooth decay. Coming back to the United States he saw that not only were our food habits bad but that our land was depleted and that the destruction of the fertility of our soil was our greatest health hazard for the future just as destructive methods of food processing were our most immediate ones. He opened for all of us the whole question of soil-health relationships.

"He discovered that there was a geographic relationship between the degree of depletion of our land and the occurrence of the evidences of physical degeneration among the people.

"We all recognize that there are two schools of thought about these soil-health relations. The one warns that at present no one can say that any alteration of the ration, much

an M-O-D calls for N-P-C and



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less of the soil, can influence in any significant way the amount of calcium that an animal puts into its milk or its muscles. These men warn that we need much more research in this field before we use man for a laboratory animal. All seem agreed, however, that more research is desirable to document the obvious.

"On the other hand, no one can object to the statements contained in the original Manifesto of Friends of the Land:

'Soil debility, soon repeated in nutritive deficiencies, spreads undernourishment. Evidence on this point is far from complete, but the trend of the accumulated findings is unmistakable. If the soil does not have it in it, plants that grow there do not, nor do animals that eat those plants; nor do the people throughout the country who eat these plants and animals.'

"Outstanding among the pioneers in this study of health as it relates to diet and through the diet to the soil is Weston A. Price. He discovered what we physicians shall, in turn, discover about other diseases if we too take a positive attitude and turn our attention to health instead of sickness. We shall find no doubt that health depends upon reaching an equilibrium with our surroundings, in striking a balance with nature. Certainly good health will not be found in the use of any of the new gadgets of civilization.

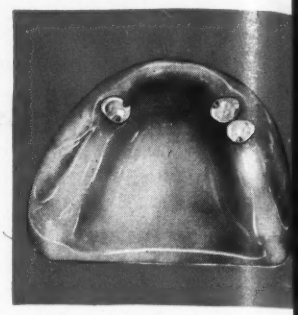
"Doctor Price found that primitive peoples had good teeth, although they had never seen a toothbrush or heard about dental hygiene. It was their diets that made the difference. While no two tribes had the same menu, yet there was a common principle running through all of their diets. These were unspoiled grains and fruits, the internal organs of animals, and food from the sea whenever it could possibly be obtained. As the white man's flour and sugar made their appearance, so did tooth decay, facial deformities, and other signs of degeneration appear.

"Doctor Price saw more clearly than most men that tooth decay was but an external sign of a systemic disorder. He believes that while painting flourides on the endangered tooth may protect the tooth itself, such a symptomatic treatment will do no more to prevent the disintegration of the rest of the body than will the 'enrichment' of white bread bring back the staff of life.

"I like to think of Doctor Price as the leader of an advance guard that is responsible for a growing popular interest in health as a positive thing opposed to sickness, and to an increasing understanding of the relation between soil and health. To this advance guard have come men with a background of scientific discipline. Among them are Sir Robert McCarrison, of India; Doctor William Albrecht of the Missouri Experiment Station, and Doctor Francis Pottenger, Jr., as well as the many physicians and dentists that have founded The Academy of Applied Nutrition.

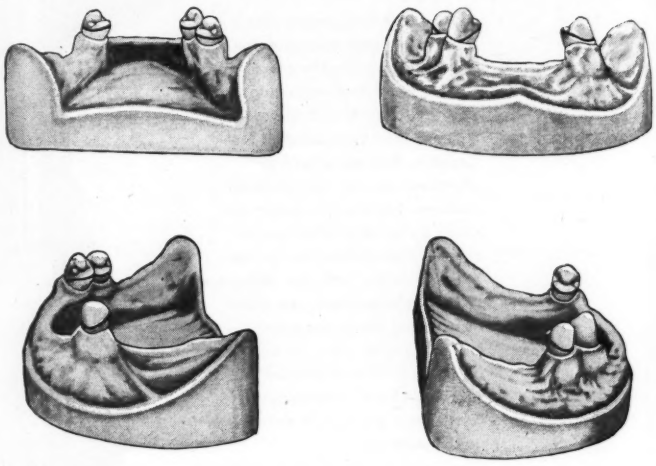
"It also includes many publicists

. . . A SURVEYOR SOLUTION



This lower model was sent to the Ney Technical Department for analysis and suggestion. (Previous case history is unknown). The Ney Surveyor showed that the remaining natural teeth had a pronounced distal tilt and that the tissue was so badly undercut that a lingual bar was out of the question — it could not be seated. Consequently, this proved to be one of those rather rare cases where a labial bar is the solution.

FOUR VIEWS OF THE MODEL SHOWING SURVEY LINES



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case with both anterior and posterior free-end saddles will ordinarily e given a posterior tilt in designing in order to accentuate the distal ndercuts on the abutment teeth and thus get the best possible retention. this mouth, however, the bicuspid abutments were already tilted distally such an extent that it was necessary to reverse this procedure and use anterior tilt.

ck-action clasps on the two bicuspid abutments will give all the retention cessary to hold the restoration securely in place. Support comes from e broad tissue-bearing posterior saddles, from the anterior saddle and om the four carefully prepared occlusal rest seats. Bracing is derived om the rigid truss arms and buccal portions of the clasps, supplemented the labial bar and the saddles.

though this was an extensive replacement, the gold framework in EY-ORO G-3 weighed only 8.50 dwt. before teeth and acrylic attachnts were added. If PALINEY #4 (white gold) had been used, the rresponding weight would have been only 6.85 dwt. Gold is, therefore, th light and economical. Most important, however, are its strength, flexlity and "cast-to-fit" qualities.

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with a considerable measure of practical experience—such men as Sir Albert Howard, Louis Bromfield, and J. E. Faulkner. But as Paul Sears has remarked: 'It is not surprising that active soil and health cults have grown up around the fringe of this advance guard. The main tenet of such groups is that, by promoting normal biologic processes in the soil and returning all possible organic matter to the soil, healthy plants, livestock, and human beings will be produced. At times some of the more enthusiastic overdo things. One example of this sort of thing is the denunciation of all artificial fertilizers. But they are, in general, on the trail of very important truths.'

"Those who insist on the importance of soil and its relation to health are not working blindly. They are drawing upon a respectable body of knowledge which deals with the large relationships in nature. I refer to the science known as ecology whose principles they are attempting to apply.

"Nature is forever trying to balance things. We of Friends of the Land are trying to get our people to help through a balanced system of agriculture and we of The Academy of Applied Nutrition are trying to bring them health through a balanced diet.

"Man was a part of a biodynamic balance until he developed tools and then he began to try to outwit nature. What modern man cannot seem to realize is that it is a losing game. What he does need to realize is that only through cooperation with nature can he gain health and happiness. Doctor Weston A. Price, as one of those rare scientists who appreciates the obvious, has pointed the way. May we march forward to consolidate the objectives he has staked out for us!"

Dental Conference in India . . .

Our colleagues in India are planning a dental conference to be held in Bombay February 19 to 22, 1948. Dentists in the United States and other parts of the world are asked to send material for presentation before the conference. The address of the Secretary of the Reception Committee, All India Dental Conference, is: Doctor R. M. Narelvala, Sambava Chambers, Sir P. M. Road, Bombay 1, India.

Style Note . . .

I am proud of men! No clothes designer has ever been able to intimidate or browbeat them into a New Look. Men go on wearing their coats and pants, sometimes varying the cut a little but not enough to look conspicuous. Suits are of two kinds: single and double-breasted, with no fancy cuts in between. Once in a great while we have the courage to flash out with a bright tie or a loud shirt. Even on those occasions we are the subject for comment and sometimes derision.

Our hats are straw in summer, felt in winter, with not many shades

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to choose from. Only the brave sport a tiny feather in the hat band.

Since the days of the button shoe, I can't recall a basic change in men's shoe design except for a few of the little extra scallops and markings now and then.

In the matter of underwear, we are positively audacious. We have given up the long union suits for more comfortable and sensible pieces. What a laugh, then, to read a report of some designer who predicts short coats, ankle-length pants for men, with battle jackets for evening wear. He must be talking about a masquerade.

No man ever threw away any piece of clothing until it was threadbare from moths or wearing or until his waist band had hopelessly expanded. Even then men hang onto their old clothes, always expecting something to turn up for which they might use them. Some of us still have our old golf knickers and high school graduation suits.—E.J.R.

Effects of Fluorine in Drinking Water on Teeth

As ALL PERMANENT teeth are calcified after birth, the fluoride content of domestic water used by a mother during gestation is immaterial. The slight signs of dental fluorosis occasionally seen on deciduous teeth are insignificant and are not sufficiently important to warrant corrective measures.

However, the continuous use from birth of a domestic water containing a fluoride concentration of four to five parts per million can be expected to produce endemic dental fluorosis in about 90 per cent of the users. Much of the dental fluorosis produced by using a water of this concentration is of a disfiguring type.

To protect the child from developing dental fluorosis in the permanent teeth, the water used for both drinking and cooking during the first eight years of life should not contain fluorides in excess of one part per million. This precaution will protect all permanent teeth with the exception

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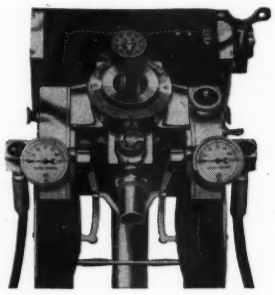
The momentary delays due to *pain interruptions* and patients' nervousness accumulate and account for costly time losses. They cause procedures to run beyond their scheduled time. And when appointments run behind the result is increased nervous strain on the operator and irritation to waiting patients.



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of the third molars. If the latter are to be protected, this prophylactic measure must be extended to the sixteenth year.

—From Queries and Minor Notes, *Journal of the American Medical Association* 135:397 (October 11) 1947.

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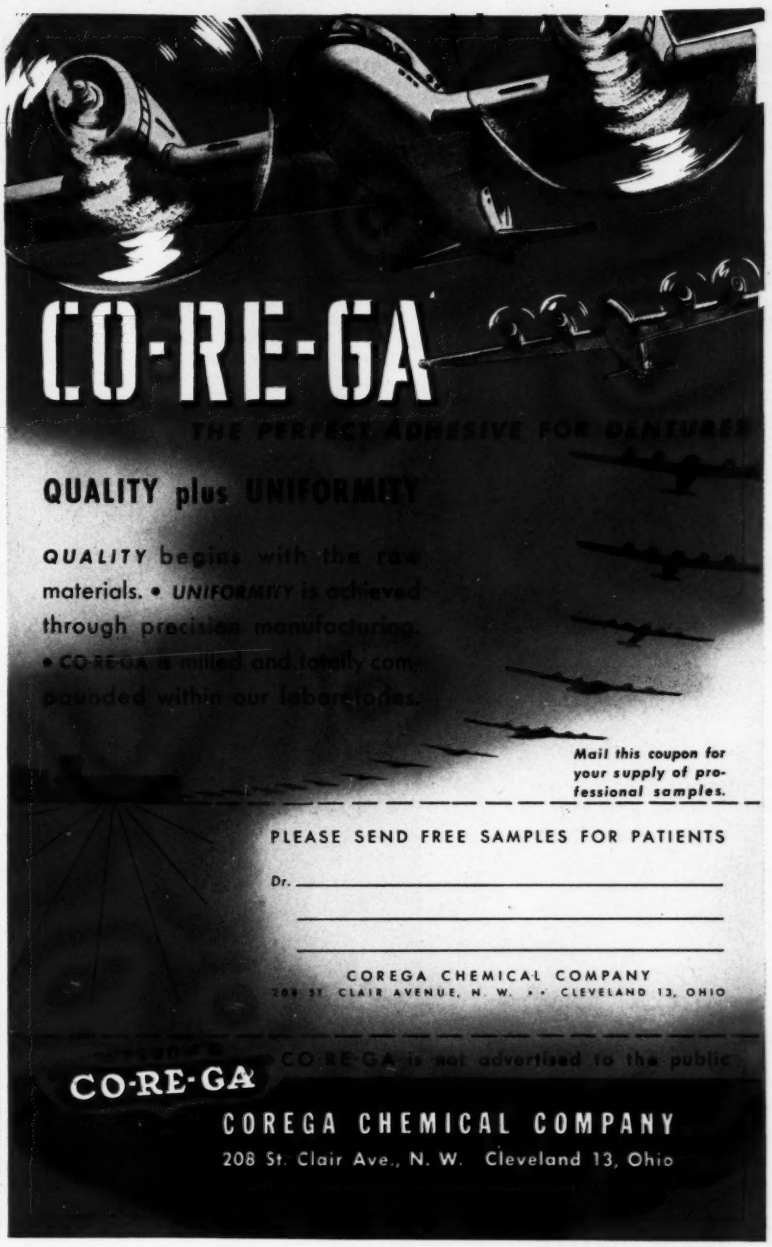
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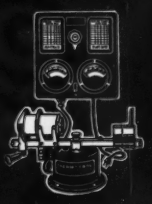

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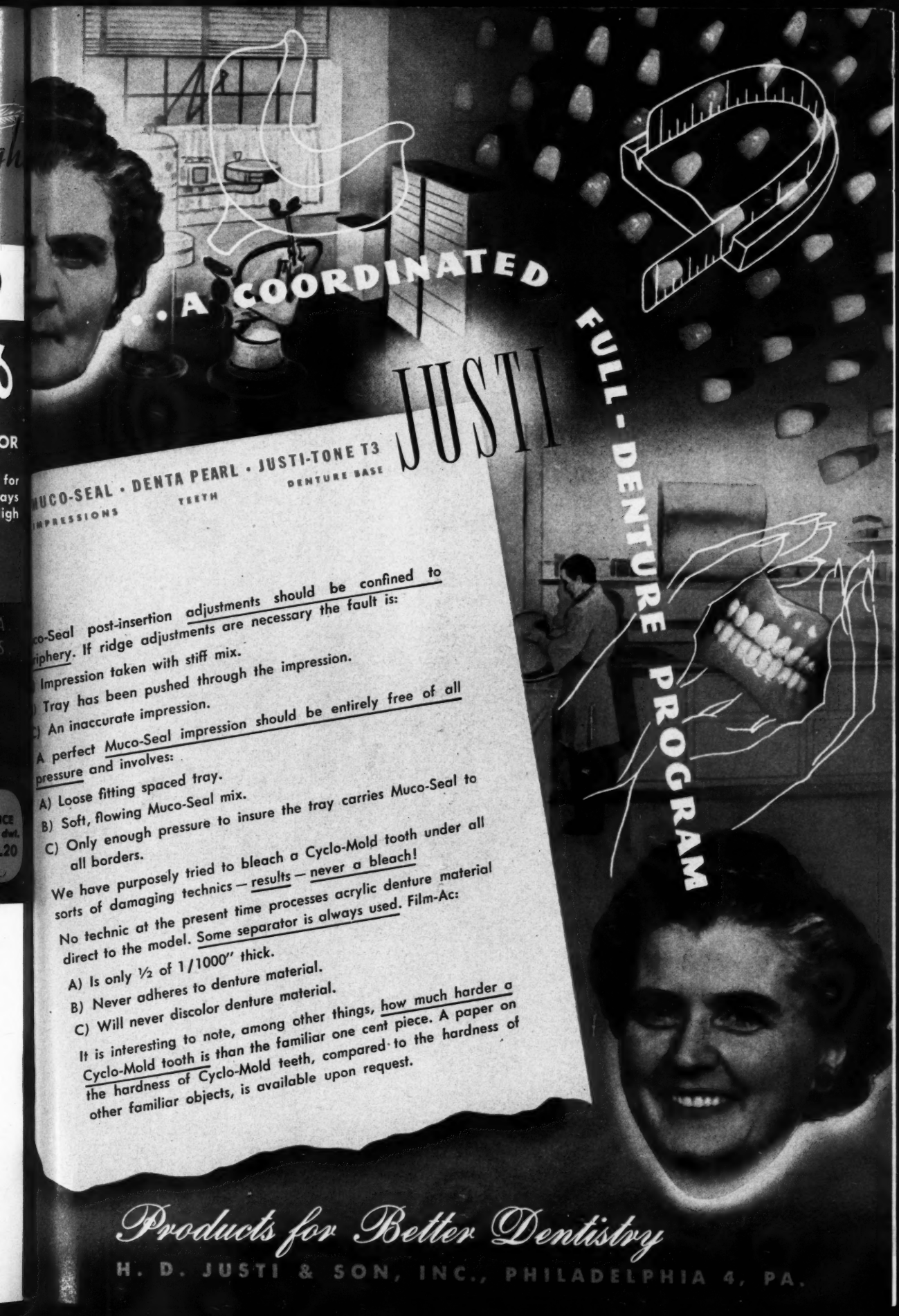
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